FISH AND GAME

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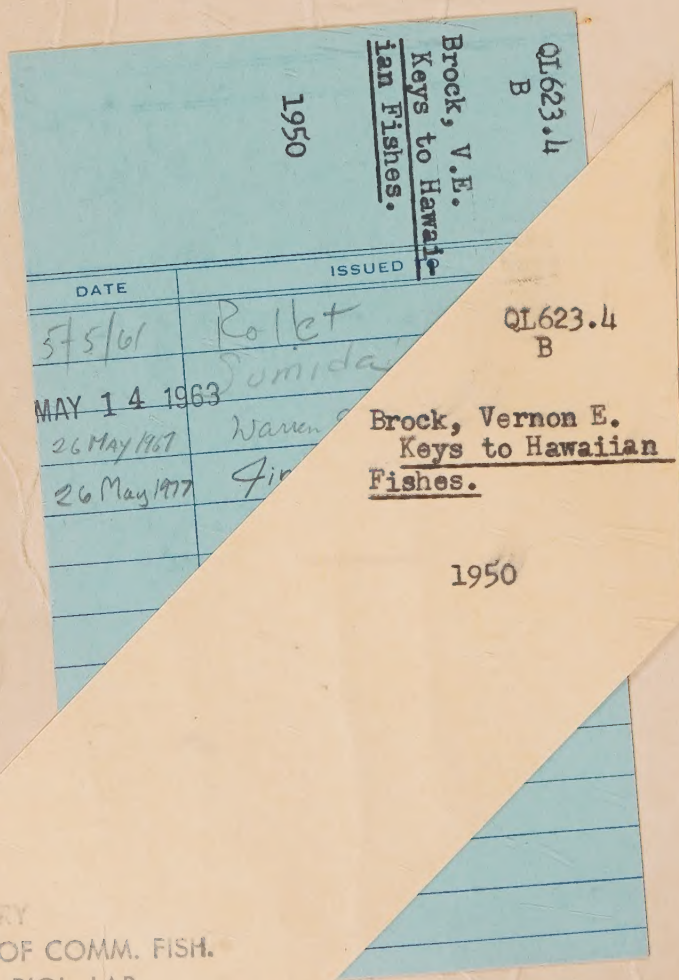

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KEYS TO HAWAIIAN FISHES

October, 1950

Vernon E. Brock

Second Working Draft

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ERRATA

COMMON NAMES	SCIENTIFIC NAMES	FAMILY NO.	SECTION NO.
Silver Marlin	Makaira marlina	93	3
Shortnosed Spearfish	Tetrapterus illingworthi.	93	1
White Marlin	Makaira marlina	93	3
Striped Marlin	Makaira mitsukurii.	93	5
	Makaira ectenes	93	5

October 26, 1950

These keys were constructed for the rapid identification of Hawaiian fishes. Keys for all families and for all species of non-bathybial families and some species of bathybial families are included. However, some familiarity with the anatomical parts of fishes is a prerequisite for their accurate use. It is not enough to presume that a casual or intuitive definition of a given anatomical character will su fice; if any doubt exists, the glossary given at the back should be consulted. Most instances of failure to properly identify a fish are traceable to a neglect of this particular matter. These keys are, of course, artificial and do not illustrate phylogenetic relationships; however, the sequence of presentation is in phylogenetic order.

This is a working draft and as such it represents something less in completeness or accuracy than would be expected in a published work. Hence, parts of these keys will be subject to future revision and also keys to the species of certain families, such as the eels, are admittedly imperfect and may prove to be a poor guide for the identification of some Hawaiian species. After all, these keys are certainly no better than the existing knowledge of the groups upon which they are based which is incomplete. And also for this reason, suggestions and corrections for revision would be sincerely appreciated by the author.

These keys represent something of a joint effort on the part of a number of people. They were started by Dr. Hamre of the University of Hawaii. The first working draft was carried through to completion by me and the present draft, which is the second, has profited greatly from suggestions from Dr. Gosline of the University of Hawaii and from his students among whom Mr. Strasburg and Mr. Yamaguchi have contributed substantially.

Vernon E. Brock, Director
Division of Fish and Game
Board of Agriculture and Forestry

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KEYS TO THE FAMILIES OF FISHES & FISHLIKE VERTEBRATES

FOUND ABOUT THE HAWAIIAN ISLANDS

Section		
1	Jaws present; a cranium enclosing a brain which is located anteriorly, see section	2
	Jaws not present; anterior end of spinal cord not expanded into a brain enclosed by a cranium. The Lancelets. (Family Branchiostomidae.) For species, see family No. ..	1
2 (1)	A single external gill opening present, see section	14
	Five external gill openings or slits, see section	3
	(A) Sharks, Dogfishes and Rays	
3 (2)	Anal fin present, (Sharks) see section	4
	Anal fin absent, (Dogfishes & Rays) see section	9
4 (3)	Eye without nictitating membrane, see section	5
	Eye with nictitating membrane, see section	8
5 (4)	Caudal fin moderate in length, substantially less than 1/2 length of entire fish, see section	6
	Caudal fin (upper lobe) greatly elongated, about 1/2 length of entire fish, Thresher sharks. (Family Alopiidae.) For species, see family No.	3
6 (5)	Caudal peduncle with a keel on each side; first dorsal fin larger than second, see section	7
	Caudal peduncle without keel on each side; pectoral fin markedly larger than small first dorsal fin which is smaller than second. Cat sharks. (Family Scyliorhinidae) (Deep sea). For species, see family No.	5
7 (6)	Gills without strainers; teeth large, subulate or triangular, entire or serrate, Mackerel sharks. (Family Isuridae). For species, see family No.	2
	Gills with strainers; teeth minute; a striking pattern of spots or checkerboard on back. Whale sharks. (Family Rhincodontidae) For species, see family No.	4

Section

8 (4) Head expanded across orbital region, kidney shaped to greatly hammer shaped, Family Sphyrnidae. The Hammer Heads. For species see family No. 8

Head not expanded across orbital region, see section .. 9

9 (8) Teeth compressed, erect, a single series functional at a time. Typical sharks. (Family Carcharhinidae) For species see family No. 6

Teeth in bands, pavement-like, more than a single series functional. (Family Triakidae) For species see family No. 7

10 (3) Gill opening on side of body; body not greatly flattened or disc-like, see section 11

Gill openings on ventral surface of body; body greatly flattened, disc-like, see section 12

11 (10) Each of the two dorsal fins with an initial spine, Dog-fishes. (Family Squalidae). For species see family No. 9

Each of the two dorsal fins without an initial spine. Deep water dogsharks. (Family Dalatiidae). For species see family No. 10

12 (10) Head anterior to disc, eyes beyond anterior margin , see section 13

Head within disc, eyes not beyond anterior margin, Sting Rays. (Family Dasyatidae). Two Hawaiian species, for which see family No. 11

13 (12) Head without cephalic lobes, Eagle Rays. (Family Myliobatidae). For species see family No. 12

Head with two cephalic lobes or flippers, Manta Rays. (Family Mobulidae). Two wide ranging species in Hawaiian waters for which see family No. 13

(B) The True Fishes and Chimaeroids

14 (2) Body scaleless; two sharp edged plate-like teeth in each jaw; numerous pores arranged in rows on snout; tail tapered to a point; a single stout spine at leading edge of first dorsal fin; snout protruding, overhangs mouth; length of pectoral fin greater than depth of body, Rat fish. (Family Chimaeridae). Deep sea. For species see family No. 14

Section		
14 (2)	While all the characters listed above may occur in other Hawaiian fishes, they do not all occur together in a single species. Hence if your fish does not possess every character enumerated above, see section	15
15 (14)	Ventral fins are present, see section	16
	Ventral fins are totally absent, see ..... Subkey D	
16 (15)	Gill openings ahead of pectoral fins, see section	17
	Gill openings are behind pectoral fins which are more or less pediculate, see subkey B, section	20
17 (16)	Ventral fins are articulated through skeletal elements with pectoral girdle, and are usually inserted at the thorax, usually just behind, under or forward of a vertical through base of pectoral fin, see section	18
	Ventral fins not articulated through skeletal elements with pectoral girdle and pectoral fins, and are usually inserted in the abdominal area well behind pectoral fin insertion, an adipose fin may be present ..... Subkey A	
18 (17)	Ventral fins with an initial spine followed by 5 rays, (which may be fused into a single fin or disk). (Family Gobiidae only), no adipose fin present, see . Subkey B	
	Ventral fins with more or less than 5 rays, see ..... Subkey C	

SUMMARY A

Ventral Fins Abdominal in Position

Section		
1	Adipose fin present, see sections	2 through 12
	Adipose fin absent, see section	13
2 (1)	Head and mouth without barbels, barbels may or may not be present at throat, see section	3
	Head and mouth with 6 barbels; first dorsal with stout spine at front of fin; a stout spine likewise on front of pectoral fins; body scaleless. Bull-heads, catfishes. (Family Ameiuridae). See family No.	32
3 (2)	Sides of body with photophores or luminous glands more or less developed; may or may not have barbels at throat, see section	8
	Sides of body without photophores or luminous glands; no barbels at throat, see section	4
4 (3)	Pseudobranchiae present; pectoral fins normally formed, see section	5
	Pseudobranchiae absent; pectoral fins not normally formed but with upper pectoral ray reaching to or beyond caudal. Family Bathypteroidae (deep sea). see family No.	27
5 (4)	Scales present on body; length of dorsal fin base less than 1/2 standard length, see section	6
	Body scaleless; length of dorsal fin base about 2/3 standard length. Handsawfishes (Family Alepisauridae) (deep sea). See family No.	25 26
6 (5)	Scales on side of head; species all found in salt or brackish water, see section	7
	No scales on side of head; Hawaiian species introduced and found only in cold fresh water streams. The salmon and trout. (Family Salmonidae). For a discussion of species, see family No.	20 21
7 (6)	Maxillary very narrow, rudimentary or obsolete; hypocoracoids not divergent; mouth opening extending well beyond posterior border of eye. Lizard fishes. (Family Synodontidae). For species see family No.	23 24

Section		
7 (6)	Maxillary well developed, dilated behind; hypocoracoids mostly divergent; mouth opening not extending beyond posterior border of eye. (Family Aulopidae) (deep sea). See family No.	22 23
8 (3)	No barbels present, see section	9
	Long barbel present at throat, body scaleless. (Family Astronesthidae) (deep sea). See family No.	19 20
9 (8)	Vertebral spines not projecting through skin of back before dorsal fin, see section	10
	Vertebral spines projecting through skin of back before dorsal fin; body short and deep, greatly compressed. Hatchet fishes. (Family Sternoptychidae) (deep sea).	
10 (9)	Pseudobranchia present, see section	11
	Pseudobranchia absent; mouth large, with canine teeth; scales deciduous or wanting. Viper fishes. (Family Gonostomidae) (deep sea).	
11 (10)	Premaxillaries forming entire margin of upper jaw; opercles complete, see section	12
	Premaxillaries not forming the whole margin of upper jaw, the maxillary entering into it; body naked; opercular apparatus incomplete. (Family Maurolicidae) (deep Sea).	
12 (11)	Form elongate; body scaleless, the snout pointed, barracuda-like; photophores very small. (Family Paralepidae) (deep sea). For species, see family No.	24 25
	Form oblong; body covered with large deciduous scales, the snout not much produced; photophores conspicuous. Lantern fishes. (Family Myctophidae) (deep sea). Species not keyed out.	
13 (1)	Dorsal single, not completely divided into two or more parts with first part composed of a number of spines either free or connected by membrane, see section ..... 14 through	33
	Dorsal fins complete divided into two or more parts, the anterior composed of spines only, either free or connected by membrane, see section ..... (See also statement below)	34
	Dorsal at posterior end of fish, giving effect of no dorsal fin, caudal actually posterior-ventral in position. Shrimp fish. (Family Centriscidae). See family No.	47 48

Section

14 (13) Caudal fin developed; tail not tapering to a point, see section 15

Caudal fin not developed; tail tapering to a point. Anal fin very long of about 200 rays; body scaly. (Family Halosauridae) (deep sea). Three Hawaiian species.

15 (14) Body without scales, see section 16

Body with scales, see section 20

16 (15) Throat without barbel, see section 17

Throat with long barbel, free at tip; no caudal filament, mouth large. (Family Stomiidae) (deep sea). Two Hawaiian species.

17 (16) Caudal fin without a filament, see section 18

Caudal fin with a long filament; body elongate; mouth very small. Cornet fish. (Family Fistulariidae). For species see family No. ..... ~~45~~ 46

18 (17) Mouth with 6 or more barbels; body eel-like or somewhat eel-like, at least elongate, see section 19

Mouth with 2 barbels or none; body not eel-like. The Carps. (Family Cyprinidae). Several species introduced into the fresh waters of the Hawaiian Islands, for which see family No. ..... ~~28~~ 29

19 (18) Dorsal fin long (more than 60 rays in the Hawaiian representative); spine present on forward edge of pectoral fin. Chinese catfish. (Family Clariidae). See family No. ..... ~~30~~ 31

Dorsal fin short (nine rays in the Hawaiian representative); spine not present on forward edge of pectoral fin. The Loaches. (Family Cobitidae). See family No. ..... ~~29~~ 30

20 (15) Pectoral fin inserted high near axis of body; lateral line along sides of belly, see section 21

Pectoral fin inserted below axis of body, see section . 23

Section

21 (20) Pectorals elongate, winglike, forming organs of flight; lower jaw not greatly produced; teeth conic, small and equal. Malolo - Flying Fishes. (Family Exocoetidae). For species, see family No. ..... ~~41~~ 42

Pectorals not greatly elongate, lower jaw or both produced; jaws either with small equal tricuspid teeth or long sharp teeth mixed with smallers, see section .. 22

22 (21) Lower jaw produced, longer than upper; teeth small and equal, teeth all tricuspid. Half beaks. (Family Hemiramphidae). See family No. ..... ~~42~~ 43

Both jaws long and slender, armed with long sharp teeth mixed with smaller. Needle fishes. (Family Belonidae). For species see family No. ..... ~~40~~ 41

23 (20) Gill membranes broadly joined to isthmus; head naked; no teeth in jaws, see section 24

Gill membranes free from isthmus, see section 25

24 (23) Body not eel-like, none or not more than four barbels about mouth. The Carps. (Family Cyprinidae). Introduced fresh water fishes. For species see family No. ..... ~~28~~ 29

Body eel-like; more than four barbels about mouth. The Loaches. (Family Cobitidae). See family No. ..... ~~29~~ 30

25 (23) Phosphorescent spots present, see section 26

No phosphorescent spots present, see section 27

26 (25) Throat with long barbel. (Family Stomiatidae). (deep sea). Two Hawaiian species.

Throat without barbel. Viper fishes. (Deep sea). Three Hawaiian species. (Family Gonostomidae).

27 (25) Head scaly, more or less, see section 28

Head naked, without scales, see section 30

28 (27) No barbel on underside of snout; mouth not inferior, see section 29

Barbel on underside of snout ahead of mouth which is inferior. Sand eels. (Family Gonorhynchidae). See family No. ..... ~~21~~ 22

Section		
29 (28)	Mouth terminal, gape reaching vertical beyond pupil of eye; maxillaries connate with premaxillaries; lateral line present. Anal fin of male not modified into an intromittent organ. Lizard fishes. (Family Synodontidae). Salt and brackish water fishes. For species see family No.	~~23~~ 24
	Mouth opening on dorsal profile; gape not reaching vertical through anterior margin of eye; maxillaries distinct; margin of upper jaw formed by premaxillaries alone; no lateral line. Anal fin of males modified into intromittent organ. Top minnows. (Family Poeciliidae). Introduced fresh and brackish water fishes. For species see family No.	~~42~~ 44
30 (27)	Gular plate absent, see section	31
	Gular plate present between branches of lower jaw; mouth large; teeth present, all pointed; axillary scales and sheaths large. Ten pounders. (Family Elopidae). see family No.	~~14~~ 15
31 (30)	Lateral line well developed, see section	32
	Lateral line wanting, see section	33
32 (31)	Teeth present; mouth small, horizontal; posterior part of tongue and roof of mouth covered with coarse pavement-like teeth. Lady fish. (Family Albulidae). See family No.	~~15~~ 16
	Teeth absent; an accessory branchial organ behind gill cavity. Milk fish. (Family Chanidae). See family No.	~~18~~ 19
33 (31)	Mouth terminal, the maxillary of about three pieces. The Herrings. (Family Clupeidae). Two Hawaiian species. For species see family No.	~~16~~ 17
	Mouth subinferior, very large, below a tapering overhanging snout; maxillary very long. The Anchovies. (Family Engraulidae). See family No.	~~17~~ 18
34 (13)	Pectoral fin entire, see section	35
	Pectoral fin not entire but with 4 to 9 lowermost rays detached and filamentous. The thread fins. (Family Polynemidae). See family No.	~~108~~ 109
35 (34)	Snout tubular bearing the short jaws at the end, see section	36
	Snout not tubular, see section	38

Section

36 (35) Soft dorsal fin not preceded by 8 or more free spines or free rays, a barbel not present at symphysis, see section 37

Soft dorsal fin preceded by 8 or more free spines or rays not joined together by membrane; a barbel present on prominent lower jaw at symphysis; body elongate. Trumpet fish. (Family Aulostomidae). See family No. ..... ~~44~~ 45

37 (36) Dorsal not posterior at normal position of caudal; body not enclosed in transparent sheath. Snipefish. (Family Macrorhamphosidae). See family No. ..... ~~46~~ 47

Dorsal posterior at normal position of caudal; body enclosed in transparent sheath, shrimp-like. Shrimp fish. (Family Centriscidae). See family No. ..... ~~47~~ 48

38 (35) Teeth small or wanting; lateral line obsolete, see section 39

Teeth strong, unequal; lateral line present. The Barracudas. (Family Sphyraenidae). Two Hawaiian species for which see family No. ..... ~~104~~ 106

39 (38) Four stout dorsal spines; three anal spines. The Mullets. (Family Mugilidae). Three Hawaiian species for which see family No. ..... ~~105~~ 107

Four to eight slender dorsal spines; single anal spine. The Silversides. (Family Atherinidae). For species, see family No. ..... ~~106~~ 108

SUBKEY B

Ventral Fins Thoracic or Subjugular,

With an Initial Spine and Five Rays

Section		
1	A single dorsal fin present which may or may not be notched, but with a connecting membrane between and therefore not complete divided into two distinct fins, see section	30
	Two or rarely more dorsal fins without any connecting membrane between them present, the first usually composed of spines or sometimes made of detached spines not connected by membrane, see section	2
2 (1)	First dorsal fin long with nine or more spines, see section	21
	First dorsal fin short with eight or fewer spines, see section	3
3 (2)	While detached dorsal spines may be present, they are not arranged as described below, see section	4
	A long single detached dorsal spine much longer than head forward of a vertical from pectoral base; another about midway over pectoral base, followed by a dorsal fin of about five spines and this in turn followed by a dorsal fin of rays; a long sharp spine on preopercle; gill openings forward of pectoral fin; pectoral fin greatly enlarged more than 2/3 length of body, winglike and marked with orange and golden spots. Flying Gurnard. (Family Cephalacanthidae). See family No. .	~~112~~ 113
	or Dactylopteridae	
4 (3)	Gill openings behind or below pectoral fins which are more or less pediculate, see section	20
	Gill openings are ahead of pectoral fins, see section	5
5 (4)	Pectoral fins without any lower rays detached and free, see section	8
	Pectoral fins with two to six lowermost rays detached and free, more or less distinctly removed from remainder of pectoral, see section	6

Section

6 (5) Not more than three detached lower pectoral rays, see section 7

Six lowermost pectoral rays detached and free, distinctly removed from remainder of pectoral, filiform and articulated; head scaly; 8 spines in first dorsal fin; length of second dorsal fin base a little greater than anal fin base. The Threadfins. (Family Polynemidae). See family No. ..... ~~107~~ 109

7 (6) Three lowermost pectoral rays detached and free, exceptionally four; head without scales, bony, spiny, and greatly flattened; first dorsal of six spines; body without scales, but with a series of bony plates along sides. (Family Hoplichthyidae) (deep sea). Two Hawaiian species.

Two lowermost pectoral rays detached and free; head scaleless, bony and spiny, with two projecting rostral processes from snout; body covered with bony plates, each armed with a spine; large barbels from tip of lower jaw and angle of mouth. See Robins. (Family Peristediidae) (deep sea). Two Hawaiian species. ..

8 (5) No barbels present at throat just behind chin, see section 9

Two barbels present at throat, just behind chin; body and head covered with large scales; mouth small, low, subterminal. The Surmullets. (Family Mullidae). For species see family No. ..... ~~69~~ 70

9 (8) More than two spines in first dorsal; less than seven spines in second; however there may be more than seven rays; profile of head not abruptly curved downward at a 90 degree angle to body axis, see section 10

Two spines only in first dorsal, which is set just above or behind a vertical through eye; seven or eight spines followed by eleven to thirteen rays in second dorsal; profile of head abruptly curved downward at a 90 degree angle, coming to a sharp edge anteriorly. The Wrasses. (Family Labridae). (See genus Iniistius). Family No. ..... ~~81~~ 82

10 (9) Posterior edge of opercle may have some spines, but usually with none, and in no case with more than 15; no fleshy tentacle over eye, see section 11

Section		
10 (9)	Posterior edge of opercle denticulate with many spines (more than 15); two spines on preorbital (beneath eye) directed forward and downward; some spines on bend of preopercle; a short fleshy tentacle over eye; lips fringed, (Family Champsodontidae). See family No. ...	~~83~~ 85
11 (10)	Posterior portion of lateral line not armed with bony scutes, see section	12
	Posterior portion of lateral line armed with bony scutes; finlets may or may not be present; two free spines in advance of anal, sometimes concealed in old fish. The Uluas or Jacks. (Family Carangidae). For the Hawaiian species of this family see family No. ...	~~75~~ 76
12 (11)	Scales of body not developed into long thin vertical strips, see section	13
	Scales of body developed into long thin vertical strips, somewhat like rough paper; diameter of eye greater than length of short snout; body deep, compressed; anal fin long with 3 spines and 38 rays. Paper scales. (Family Grammicolepidae) (deep sea). See family No. .	~~54~~ 55
13 (12)	Preopercle without large spines, may have many small ones; opercle may or may not have spines, see section	14
	Preopercle with large spine, projecting posteriorly and may or may not have recurved hooks on inner margin; no spines on opercle; body without scales; gill membranes broadly attached to isthmus. (Family Callionymidae) (deep sea).	
14 (13)	Gill membranes free from isthmus; lateral line present, see section	16
	Gill membranes broadly attached to isthmus; no lateral line, see section	15
15 (14)	Ventral fins united, fused into a single median fin. The Gobies. (Family Gobiidae). For Hawaiian species see family No.	~~94~~ 96
	Ventral fins separate. The Sleepers. (Family Eleotridae). For Hawaiian species see family No.	~~93~~ 95
16 (14)	Number of rays in anal fin more than 15, see section	17

Section

16 (14) Number of rays in anal fin less than 10, usually 8; body covered with large scales, usually 22 to 26 in the lateral line. The Cardinal fishes. (Family Apogonidae). For species in Hawaii see family No. ..... ~~55~~ 56

17 (16) Greatest depth of body goes more than, usually more than twice, 1.5 times in its standard length, see section ... 18

Greatest depth of body goes less than, usually about once, 1.5 times in its standard length, (Family Caproidae) (deep sea). 2 Hawaiian species.

18 (17) Base of second dorsal fin longer than or about equal to base of anal fin; likewise number of rays in second dorsal greater than or about equal to number of rays in anal fin; two free spines in advance of anal fin, sometimes concealed in old fish, see section 19

Base of second dorsal fin shorter than base of anal fin; likewise number of dorsal fin rays less than number of anal fin rays; no free spines before anal fin. (Family Parapercidae). For Hawaiian species see family No. .... ~~71~~ 72

19 (18) Length of anal fin base less than 2/3 of length of second dorsal fin base; finlets may or may not be present; first dorsal fin spine not procumbent. The Amberjacks. (Family Seriolidae). For Hawaiian species see family No. ~~76~~ 77

Length of anal fin base more than 2/3 of length of second dorsal fin base; first dorsal fin spine is procumbent. The Uluas or Jacks. (Family Carangidae). For Hawaii species see family No. ..... ~~75~~ 76

20 (4) Head compressed; no pseudobranchia. Angler fishes. (Family Antennariidae). For species occurring in Hawaiian waters see family No. ..... ~~124~~ 126

Head depressed, flattened, pseudobranchia present. Frogfish. (Family Lophiidae). See family No. ..... ~~123~~ 125

21 (2) No finlets present, see section 25

Finlets present following second dorsal and anal, see section 22

22 (21) Caudal peduncle without a keel or keels; only a pair of finlets present; first dorsal fin base several times longer than body is deep; depth of caudal peduncle greater than width of eye. Snake Makerels. (Family Gempylidae). For Hawaiian species see family No. 87 89

Section		
22 (21)	Caudal peduncle with a keel or keels; many finlets present; depth of caudal peduncle less, about the same, or slightly greater than width of eye, see section	23
23 (22)	A large median keel on each side of caudal peduncle and a small one above and below the large one, see section .	24
	There is no middle keel on each side of caudal peduncle, first dorsal fin separated from the second dorsal fin by an interspace as long as or longer than snout; color on back of almost vertical stripes. Makerels. (Family Scombridae). See family No.	~~89~~ 91
24 (23)	First dorsal fin with 9 weak spines; lateral line curved abruptly downward behind pectoral tip, the vertical portion greater in length than 1/2 greatest depth of body, then it curves up to a point, and then curves back down again and finally up to approximately the midline. Deep sea color. (Family Gempylidae). See family No. ..	~~87~~ 89
	First dorsal fin with 10 or more spines; lateral line not curved abruptly downwards for more than 1/2 greatest depth of body. The Tunas. (Family Thunnidae). For species occurring in Hawaiian waters see family No. ...	~~90~~ 92
25 (21)	Premaxillaries moderately protractile or not protractile, see section	26
	Premaxillaries excessively protractile, their basal processes very long, in a groove at top of cranium; teeth not present; spines of first dorsal slender. (Family Emmelichthyidae). See family No.	~~66~~ 67
26 (25)	Greatest depth of body goes more than 1.25 times in its standard length, see section	26
	Greatest depth of body goes less than 1.25 times in its standard length, usually less than 1 time. (Family Caproidae) (deep sea). Two Hawaiian species.	
27 (25)	Body not elongate, not compressed, covered with hard grooved scales; jaws boxlike. Square tails. (Family Tetragonuridae). See family No.	~~102~~ 104
	Body not as above, see section	27

28 (27) No suborbital bony stay present; cranium without spines, see section 29

Suborbital with bony stay which extends across cheek to preopercle; spines present on some of the bones of the cranium; head and body somewhat flattened. Alligator fishes. (Family Platycephalidae) (Deep sea). See family No. ..... ~~111~~ 112

29 (28) Fourteen or more soft dorsal fin rays; 14 or more soft anal fin rays; greatest diameter of eye goes more than 3 times in greatest body depth. Butterfishes. (Family Nomeidae). For Hawaiian species see family No. ..... ~~101~~ 103

There are 9 soft dorsal fin rays and 7 soft anal fin rays; or if ray count exceeds this, the eye is very large, its diameter going less than 2.5 times in greatest body depth. Cardinal fishes. (Family Apogonidae). For Hawaiian species see family No. ..... ~~55~~ 56

30 (1) Dorsal fin with some stiff, sharp pointed fin spines, differentiated into an initial spiny part followed by a part composed of soft rays, see section 41

Dorsal fin without any stiff, sharp pointed fin spines, not markedly differentiated into an initial spiny portion followed by soft rays, see sections ..... 31 through 40

31 (30) Some of the fin rays branched or divided other than the rays of the caudal fin, see section 32

Fin rays, with the possible exception of some caudal rays, all simple, not branched or divided; body scaleless, except in one case for a row of scales along the lateral line. Sandfishes. (Family Trichonotidae). For species see family No. ..... ~~72~~ 73

32 (21) Caudal peduncle without bony scutes, see section 33

Bony scutes present on posterior portion of lateral line, at least on caudal peduncle. The Uluas or Jacks. (Family Carangidae). For Hawaiian species see family No. ..... ~~75~~ 76

33 (32) No sucking disk present on top of head, see section ... 34

A sucking disk on top of head, composed of 8 to 30 transverse plates. Shark suckers. (Family Echeneididae). For Hawaiian species, see family No. ..... ~~116~~ 117

Section		
34 (33)	Caudal fin widely forked, with a definite V shaped hind edge, see section	35
	Caudal fin usually rounded or truncate, may be more or less lunate (outer rays extended), see section	36
35 (34)	Mouth very oblique; maxillary broad and scaly; dorsal and anal fin bases roughly of equal length. Pomfrets. (Family Bramidae). For species, see family No.	78
	Mouth not oblique; maxillary not scaled; dorsal and anal fin bases not of equal length, anal about 1/2 that of dorsal. Dolphins. (Family Coryphaenidae). For species, see family No.	~~77~~ 79
36 (34)	Gill openings forward of pectoral fin, see section ...	37
	Gill openings behind and inside of pectoral fins; body flattened, paddle shaped. Bat fish. (Family Oneocephalidae) (Deep sea).	
37 (36)	A strong spine present on opercle, see section	38
	Opercle without a stout spine, see section	39
38(37)	Ventral fins short, less than 1/2 length of head; diameter of eye less than 1/3 length of maxillary. Whitefishes. (Family Malacanthidae). See family No.	~~70~~ 71
	Ventral fins long over 2/3 length of head; diameter of eye about equal to length of maxillary. (Family Parapercidae). For Hawaiian species see family No. ...	~~71~~ 72
39 (37)	First rays of dorsal not greatly elongate, not extending beyond caudal fin; teeth not setiform; body much longer than deep, see section	40
	First rays of dorsal elongate, sweeping back beyond caudal; snout protruding, somewhat tubular with mouth at tip; teeth brushlike, setiform; body about as deep as long. Moorish Idols. (Family Zanclidae). For species, see family No.	~~85~~ 87
40 (39)	Canine teeth present in anterior portion of mouth, not fused, but separate and distinct. The Wrasses. (Family Labridae). For Hawaiian species, see family No.	~~81~~ 82
	Teeth fused into two beak-like plates in each jaw. The Parrot fishes. (Family Scaridae or Callyodontidae). For Hawaiian species, see family No.	~~82~~ 83

Section

41 (30) None of the bones of the cranium proper spiny, no bony suborbital stay present, see section 42

Some of the cranium bones more or less spiny; opercles and preopercles spiny. Bony suborbital stay present, crossing below eye to preopercle.[1] Scorpion fishes. (Family Scorpaenidae). For Hawaiian species, see family No. ..... ~~102~~ 110

42 (41) Lowermost pectoral rays branched like the upper ones; fin membranes not deeply incised, head not armed with many sharp spines, see section 44

About one half of the lowermost pectoral rays unbranched, stout, the fin membranes between deeply incised, see section 43

43 (42) Dorsal fin with 18 spines, the first and second spine very short, the third spine very long and heavy, and the remaining spines graduated in size. Manila fishes. (Family Cheilodactylidae). See family No. ..... ~~73~~ 74

Dorsal fin with 10 to 12 spines. Hawkfish. (Family Cirrhitidae). For Hawaiian species, see family No. ... ~~74~~ 75

44 (42) Caudal peduncle without spines or bony protuberances, see section 45

A single folding spine or two sharp edged bony protuberances present on side of caudal peduncle. Surgeonfishes - Tangs. (Family Acanthuridae). For Hawaiian species, see family No. ..... ~~87~~ 88

45 (44) Scales of body not developed into long thin vertical strips, see section 46

Scales of body developed into long thin vertical strips, somewhat like rough paper; diameter of eye greater than length of short snout; body deep, compressed; anal fin long with 3 spines and 38 rays. Paper scaled fishes. (Family Grammicolepidae). (deep sea). See family No. . ~~54~~ 55

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1. The bony suborbital stay can generally be found by feeling with the finger in the region of the cheek beneath the eye. It should not be confused with the orbital bones immediately beneath and around the eye.

Section		
46 (45)	Teeth not setiform, see section	48
	Teeth setiform or brushlike; body coloration usually striking with yellow and black; body deep and flattened or if not deep and flattened with a stout spine at angle of preopercle, see section	47
47 (46)	Dorsal fin with two initial spines and over 45 rays. The Moorish Idols. (Family Zanclidae). For species see family No.	87
	Dorsal fin with 12 or more initial spines and 26 or less rays. Angel or Butterfly fishes. (Family Chaetodontidae). For Hawaiian species, see family No.	86
48 (46)	A pair of nostrils on each side of snout,[2] see section .	50
	A single nostril on each side of snout, see section ...	49
49 (48)	Anal fin with two initial spines; species all marine. Damsel fishes. (Family Pomacentridae). For Hawaiian representatives, see family No.	81
	Anal fin with three or more initial spines; species all introduced freshwater forms. (Family Cichlidae). See family No.	80
50 (48)	No barbels present on chin, seven or more initial dorsal spines present. See section	51
	Only 4 initial spines in dorsal fin followed by 28 rays; cluster of barbels at chin, each barbel about 1/2 diameter of eye in length. Boarfish (Family Histiopteridae) See family No.	66
51 (50)	Body color pattern consists of 5 or 6 horizontal bars dark brown in color against a creamy white background; 11 dorsal spines; size small six inches or less; depth of body 2/3 of length. Angel fishes. (Family Scorpidae) See family No.	84a
	All characters described above not present, see section .	52
52 (51)	Greatest depth of body goes more than 1.25 times in its standard length, usually more than 2 times, see section .	53

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2. These nostrils may be close together and high on the snout near the foreborder of the eye.

Section

52 (51) Greatest depth of body goes less than 1.25 times in its standard length, usually less than 1 time. (Family Caproidae) (deep sea). 2 Hawaiian species

53 (52) Ventral insertion much nearer tip of snout than caudal base, see section 54

Greatest depth of body at a vertical through pectoral fin base; ventrals inserted about or a little ahead of midpoint of distance between tip of snout and base of caudal fin; ventral profile decidedly more steeply curved than dorsal. (Family Gregorvinidae). See family No. ..... ~~67~~ 68

54 (53) Teeth, if present, not fused or coalesced to form a beak, see section 56

Teeth fused or more or less coalesced to form a beak which may have a median suture, see section 55

55 (54) Scales large, 35 or usually less in lateral series; lateral line interrupted. Parrot fishes. (Family Scaridae) see family No. ..... ~~82~~ 83

Scales small, 90 or more in lateral series; lateral line not interrupted. (Family Oplegnathidae). See family No. ..... ~~68~~ 69

56 (54) No molar teeth present at side and back of jaws, see section 57

Molar teeth present at side and back of jaws. (Family Sparidae). See family No. ..... ~~63~~ 64

57 (56) Lateral line not interrupted, see section 59

Lateral line interrupted, see section 58

58 (57) A vertical through end of premaxillary not beyond hind-border of eye. The Wrasses. (Family Labridae) See family No. ..... ~~81~~ 82

A vertical through end of premaxillary extends well beyond hindborder of eye. (Family Pseudochromidae). See family No. ..... ~~59~~ 60

59 (57) Scales on body moderate or small in size, numbering 33 or more (to over 100) in the lateral line, See section . 60

Scales on body large, numbering 30 or less in the lateral line. The Wrasses. (Family Labridae). See family No. .. ~~81~~ 82

Section

60 (59) There are 13 or more spines and rays (combined count) in the anal fin, see section 64

There are 12 or less spines and rays (combined count) in the anal fin, see section 61

61 (60) There are 9 to 11 rays in the dorsal fin, see section . 63

There are 13 to 17 rays in the dorsal fin, see section 62

62 (61) Area between eyes and forward on top of head with scales. Sea Basses. (Family Serranidae). See family No. ..... ~~58~~ 59

Area between eyes on top of head not scaled; scaly area beginning even with posterior part of eyes or futher back. The Snappers. (Family Lutianidae). See family No. ..... ~~61~~ 62

63 (61) Preoperculum scaled. The Snappers. (Family Lutianidae) See family No. ..... ~~61~~ 62

Preoperculum without scales. (Family Lethrinidae). See family No. ..... ~~62~~ 63

64 (60) Pseudobranchiae present, well developed, see section .. 65

Pseudobranchiae absent, or covered by skin. The Sunfishes. (Family Centrarchidae) Fresh water, introduced from North America. See family No. ..... ~~57~~ 58

65 (64) Small scales not covering basal and middle portion of dorsal, anal, and caudal fin rays, see section 66

Small scales covering basal and middle portion of dorsal, anal, and caudal fin rays; incisor teeth present in single row at front of jaw. Rudder Fishes. (Family Kyphosidae). See family No. ..... ~~64~~ 65

66 (65) There are twelve or fewer rays in the anal fin, see section 67

There are 14 or more rays in the anal fin; color may be mottled reddish; eye large, gape of mouth opening obliquely upward and forward. The Big Eyes. (Family Priacanthidae) See family No. ..... ~~60~~ 61

67 (66) Gill membranes not completely free, somewhat joined; lips thick, sometimes with longitudinal folds; canines usually present; scales cycloid. The Wrasses. (Family Labridae) See family No. 81

Section

67 (66) Gill membranes separate; lips not especially thickened; no canine teeth in jaws; scales ciliated or ctenoid; Mountain Bass. (Family Kuhliidae) See family No. ... ~~56~~ 57

SUBKEY 2

Ventral Fins Thoracic or Jugular,

Number of Rays either more or less than 5

Section		
1	Eyes symmetrical, one on each side of head, see section	4
	Eyes unsymmetrical, both on the same side of the head, see section	2
2 (1)	Eyes large, well separated; edge of preopercle usually evident, see section	3
	Eyes small, very close together; edge of preopercle hidden by skin; mouth very small. Tongue fish. (Family Cynoglossidae) (deep sea).	
3 (2)	Dorsal fin rays number 12 to 18 rays not greatly produced, not free from membrane; first four or five anal rays not likewise produced and free from membrane. Flounders. (Family Bothidae). For Hawaiian species, see family No.	~~113~~ 115
	Dorsal fin rays number 12 to 18 greatly produced and extending beyond membrane; first 4 or 5 anal rays likewise produced and extending beyond membrane. Bastard Halibuts. (Family Paralichthidae). See family No. ...	~~114~~ 116
4 (1)	Ventral fins with or without spines, the number of rays more than 5, see section	5
	Ventral fins with or without spines, the number of rays fewer than 5, see section	16
5 (4)	Caudal fin well developed, see section	6
	Caudal fin wanting, scales spinous. Grenadiers. (Family Macrouridae (Coryphaenoididae) (Deep sea).	
6 (5)	Chin with one or two barbels below tip, see section ...	7
	Chin without barbels, or if barbels are present about mouth, eight are present, see section	8
7 (6)	Chin with two long barbels, behind symphysis; dorsal continuous with five spines. (Family Polymixiidae) (deep sea). See family No.	~~51~~ 52
	Chin with a single barbel. Jaws and vomer without distinct canines; ventrals jugular in position; no spine in any of the fins. Cods. (Family Gadidae) (deep sea).	

Section		
8 (6)	No adipose fin, see section	10
	Adipose fin present, see section	9
9 (8)	Dorsal fin short, with 15 or fewer rays; species in shoal water and habitually on the bottom. Lizard fishes. (Family Synodontidae) See family No.	~~23~~ 24
	Dorsal fin long, occupying larger part of the length of the back, dorsal fin rays numbering 20 in the very young to 44 or more in adult; deep sea species not habitually on sea floor. Wolf-fish. (Family Alepisauridae) See family No.	~~25~~ 26
10 (8)	Ventral rays 6 to 10, see section	11
	Ventral rays about 15, dorsal single, elevated; body deep and flat. The Opah. (Family Lamprididae). See family No.	~~49~~ 50
11 (10)	Dorsal fin without spines, more than 40 rays, long and low; introduced freshwater fishes, see section	12
	Dorsal fin with two or more spines; native freshwater or marine fishes, see section	13
12 (11)	Eight barbels present about mouth; skin smooth, scaleless. Chinese catfish. (Family Clariidae). See family No. ...	~~30~~ 31
	No barbels present about mouth; body covered by scales; Head somewhat snake-like in appearance. Snakeheads. (Family Ophicephalidae). See family No.	~~104~~ 105
13 (11)	Dorsal fin notched or divided, with an anterior spinous part easily distinct from a posterior part of rays, see section	15
	Dorsal fin continuous, not distinctly notched or divided into two parts, see section	14
14 (13)	Anal fin long with 4 spines and more than 25 rays; scales ctenoid; color rose in fresh or living animal. (Family Berycidae). See family No.	~~52~~ 53
	Anal fin short with one or two spines and less than 10 rays; scales cycloid or leaf-like, pedunculated; color dark in fresh or living animal. (Family Melamphaidae) (deep sea). Two species in Hawaiian Waters.	
15 (13)	Body covered with firm serrated scales; anal spines 4, the first one sometimes quite small; length of pectoral fin twice or more eye diameter. Squirrel fishes. (Family Holocentridae). See family No.	~~53~~ 54

Section

15 (13) Body naked or covered with small scales, besides bony plates or warts; anal spines 1 or 2 or 3; length of pectoral fin less than twice eye diameter. The John Dories. (Family Zeidae).

16(4) Gill openings in front of the pectoral fin, see section 17

Gill openings behind the pectoral fins, see section 30

17 (16) Anal fin present; insertion of dorsal not ahead of eye; body not band or ribbon shaped; see section 18

Anal fin not present; insertion of dorsal ahead of eye; body band or ribbon shaped, elongate. Oarfish. (Family Lophotidae or Regalecidae). See family No. ..... ~~50~~ 51

18 (17) Anal fin may or may not be confluent with caudal, but if confluent with caudal, dorsal fin is likewise confluent, see section 19

Anal fin is alone confluent with caudal; entire dorsal fin falls two or three times the length of its base anterior to a vertical from anal fin insertion; dorsal fin short, less than 10 rays; anal fin long, more than 100 rays. (Family Ateleopidae). See family No. ..... ~~27~~ 28

19 (18) Upper jaw not prolonged into sword or tips of both jaws not pointed, projecting, and bony, see section 20

Upper jaw prolonged into a bony sword; tips of both jaws pointed, projecting, and bony. Sailfish or Marlin. (Family Istiophoridae). For the species found in Hawaiian waters, see family No. ..... ~~21~~ 93

20 (19) No bony tubercles or spines on each side of caudal peduncle, see section 21

Two bony tubercles or spines on each side of caudal peduncle; skin tough, sharklike; gill membranes broadly united to the isthmus. Surgeon fishes. (Family Acanthuridae). See family No. ..... ~~26~~ 88

21 (20) Dorsal fins of soft rays only, see section 27

Dorsal fins with some spines, which may have flexible tips, see section 22

Section		
22 (21)	Dorsal fins of spines anteriorly, with soft rays posteriorly, spines connected by membrane, see section	23
	Dorsal fins without soft rays, composed of spines only. The Blennies. (Family Blenniidae). See family No.	~~96~~ 97
23 (22)	Body not covered with minute, pointed fleshy papillae, see section	24
	Body covered with minute, pointed fleshy papillae; a large preorbital spine depressible into groove; body short, compressed, greatest depth more than 1/2 standard length. (Family Caracanthidae). For Hawaiian species, see family No.	~~110~~ 111
24 (23)	Suborbital without bony stay, see section	25
	Suborbital with a bony stay extending across cheek to or toward opercle, the cheek sometimes entirely covered with a coat of mail; pectoral fin divided into two parts, one of them very long, head bony. Flying Gurnard. (Family Dactylopteridae). See family No.	~~112~~ 113
25 (24)	Gill membranes separate, free from isthmus, see section ...	26
	Gill membranes broadly united, may or may not be attached to the isthmus; gill opening moderate or large. Blennies. (Family Blenniidae). See family No.	~~96~~ 97
26 (25)	Soft dorsal and anal with finlets posteriorly. Snake Mackerels. (Family Gempylidae). See family No.	~~87~~ 89
	Soft dorsal and anal without finlets. Cutlass fishes. (Family Trichiuridae). See family No.	~~88~~ 90
27 (21)	Snout not square in cross-section with series of coarse retrorse spines on lengthwise ridges; pectoral fins not greatly enlarged and winglike, see section	28
	Snout projecting, square in cross-section, each of the lengthwise ridges provided with a series of coarse retrorse spines, body encased in box; tail encased in eight bony rings; pectoral fins greatly enlarged, winglike. Sea Moth. (Family Pegasidae). See family No.	~~113~~ 114
28 (27)	Barbels may or may not be present about mouth; if present not more than one at tip of lower jaw, see section	29
	Barbels present, four long and six short barbels on upper lip; and six long barbels on lower lip; dorsal and anal fins confluent posteriorly. (Family Brotulidae). See family No.	~~99~~ 100

Section

29 (28) Body covered with scales; gill membranes usually not markedly confluent, see section 30

Body naked, without scales; gill membranes united across isthmus. The Blennies. (Family Blennidae). For Hawaiian species, see family No. ..... ~~96~~ 97

30 (29) Caudal fin present, The Cods. (Family Gadidae).

Caudal fin absent, The Grenadiers. (Family Corvhaenoididae or Macrouridae) (deep sea).

31 (16) Gill openings above and behind pectorals, mouth small, low; body flattened dorsoventrally. (Family ~~Oreocephalidae~~ Oncocephalidae) (deep sea).

Gill openings below and behind pectorals; mouth large nearly vertical; body rounded or somewhat compressed laterally. Angler fish. (Family Antennariidae). For species occurring in Hawaiian waters, see family No. ..... ~~125~~ 126

[illegible]

Bony Fishes

Ventral Fins Absent

Section

1 Body elongate, eelshaped, not mailed or armoured, greatest depth going 8 or more times in length, usually much more; fin rays, if present, not spinous; no distinct caudal fin present, dorsal and anal fins may or may not join at tail, see section 2

Body may or may not be eelshaped, but if eelshaped, it is either mailed, or a distinct caudal fin is present, or some spinous fin rays present, see section 16

2 (1) A single external gill opening inferior in position, see section 3

Two external gill openings usually at junction of head and body lateral in position, see section 5

3 (2) Pectoral fins present; eye well developed; species marine, see section 4

Pectoral fins absent; eye small; freshwater species, Ricefield eels, (Family Symbranchidae). See family No. .. ~~125~~ 127

4 (3) Skin covered with rudimentary embedded scales, usually linear in form, arranged in small groups and placed at right angles to those of neighboring groups; jaws not slender and recurved. (Family Synaphobranchidae). See family No. ..... ~~32~~ 33

Skin naked, without scales; jaws slender and recurved. Snipe eels. Deep sea. (Family Nemichthyidae)

5 (2) Gill membranes complete free from isthmus, may or may not be united, see section 6

Gill membranes broadly united to the isthmus, restricting gill openings to the sides, see section 8

6 (5) Vent not at throat, see section 7

Vent at throat. Pearl fish. (Family Carapidae). See family No. ..... ~~99~~ 101

7 (6) Body without scales; gill membranes separate and free from isthmus; enlarged, fang-like teeth present. Deep sea. (Family Lycodapodidae). See family No. ..... ~~27~~ 99

A single series of small scales present on body; gill membranes broadly united, but free from isthmus. Blenny eel. (Family Congrogadidae). See family No. ..... ~~26~~ 98

8 (5) Gill openings well developed, leading to large interbranchial slits; tongue present; opercles and branchial bones well developed; scapular arch present; see section 9

Gill openings small, roundish, leading to restricted interbranchial slits; tongue wanting; pectoral fins wanting; opercles feebly developed; fourth gill arch modified, strengthened and supporting pharyngeal jaws; scapular arch obsolete or represented by cartilage; skin thick, smooth and without scales; coloration often variegated. Moray eels. (Family Echidnidae). Eels of the coral reef, savage, with large mouths well armed with numerous teeth, for species, see family No. ..... ~~39~~ 40

9 (8) Scales wholly wanting, see section 10

Skin covered with rudimentary embedded scales, usually linear in form, arranged in small groups and placed obliquely at right angles to those of the neighboring groups; pectoral and vertical fins well developed, the latter confluent about tail; lateral line present; posterior nostril in front of eyes; tongue with margins free, small gill openings inferior, very close together, apparently confluent; branchiostegal rays abbreviated behind; head conical. (Family Synaphobranchidae) (deep sea). See family No. ..... ~~32~~ 33

10 (9) Length of tail (the distance from anal opening to tail tip) more than 1/2 length of head and trunk (the distance from snout tip to anal opening) and usually as long as head and trunk together or longer, see section 11

Length of tail less than 1/2 length of head and trunk; body cylindrical; dorsal and anal fins scarcely developed; confined to tail and beginning about length of head behind anal opening; small caudal present; gill openings rather narrow, inferior, but well separated. Whip eels. (Family Ratabouridae or Morinyuidae). See family No. ..... ~~38~~ 39

11 (10) Tip of tail with a more or less distinct fin, the dorsal and anal fins confluent around it; tail sometimes ends in long filament. Coloration almost always plain, brownish, blackish, or silvery; the fins often black margined, see section 12

Section

11 (10) Tip of tail without rays, projecting beyond the dorsal and anal fins; posterior nostril on edge of upper lip; anterior nostril near tip of snout, usually in small tube; tongue usually adnate to floor of mouth. Snake eels. (Family Ophichthyidae). For species, see family No. 38

12 (11) Posterior nostril without tube, situated entirely above upper lip, see section 13

Posterior nostril close to the edge of the upper lip; tongue more or less fully adnate to the floor of the mouth; teeth subequal. Worm eels. (Family Echelidae or Myridae). For species, see family No. 37

13 (12) Tongue narrow, adnate to floor of mouth or only tip slightly free; vomerine teeth well developed, sometimes enlarged, see section 14

Tongue broad, largely free anteriorly and on sides; vomerine teeth moderate; pectoral fins well developed; body not excessively elongate; lower jaw not projecting; anterior nostril remote from eye. Conger eels. (Family Congridae or Leptocephalidae). For species, see family No. 35

14 (13) Jaws not attenuated and recurved at tip; gill openings well separated; anterior nostril remote from eye, see section . 15

Jaws long and slender, tapering to a point, recurved at tip; nostrils large, both pairs close in front of eye; gill openings convergent forward, separate or confluent; pectorals and vertical fins well developed; membranes of fin thin, not enveloping rays; skeleton well developed. Deep sea eels. Snipe eels. (Family Nemichthyidae). 4 species reported from Hawaiian waters.

15 (14) Pectoral fins well developed; skin thick; skeleton firm; snout moderate; tail not ending in a filiform tip. (Family Muraenesocidae). See family No. 34

Pectoral fins wholly wanting; snout and jaws much produced, the upper longer; jaws straight; skin thin and skeleton weak; tail ending in a filiform tip; gill openings small, subinferior; teeth sharp, subequal, recurved, a long series on the vomer. Deep sea eels, soft in body, black in color. Duckbilled eels. (Family Nettastomatidae). For species, see family No. 36

16 (1) Gill openings separate, not united in a longitudinal slit below throat; see section 17

Section

16 (1) Gill openings united in a longitudinal slit below throat; pectoral fins absent; body eel shaped. Rice field eels. (Family Symbranchidae). See family No. ..... ~~125~~ 127

17 (16) Gill openings in front of pectoral fins; see section 18

Gill openings far behind pectoral fin; mouth oblique, very large; spiny dorsal represented by fleshy tentacles. Sea devils. (Family Ceratiidae) (deep sea.) Two Hawaiian species.

18 (17) Gill membranes broadly united to the isthmus, restricting the gill openings to the sides, see section 19

Gill membranes completely free from isthmus, may or may not be united, see section 26

19 (18) Snout not tubular, see section 20

Snout tubular, bearing the short toothless mouth at end; body mailed. The pipe fishes and Seahorses. (Family Syngnathidae). See family No. ..... ~~48~~ 49

20 (19) Dorsal fin continuous, of soft rays only, see section ... 22

Dorsal fin two, the first composed of spines, the second of rays, see section 21

21 (20) First dorsal composed of three, rarely two spines (Genus Xanthichys Kaup); the first spine very large, the second locking it in erection; scales between 35 and 80 in lateral series, bony, rough, forming a coat of mail. Trigger fish. (Family Balistidae). For species, see family No. ..... ~~117~~ 118

First dorsal of a single spine with a rudiment at its base; scales not bony, the edges spinescent, so that the surface of the body is rough velvety, and so minute in size that counts of the number in lateral series are not reported. Filefish. (Family Monacanthidae). For species, see family No. ..... ~~118~~ 119

22 (20) Body not enveloped in a bony box; teeth confluent into either one or two in each jaw, see section 23

Body enveloped in a bony box; teeth separate, more than one or two in each jaw. Trunkfish. Cowfish. (Family Ostraciidae). For species, see family No. ..... ~~119~~ 120

23 (22) Teeth in each jaw confluent into one, see section 24

Teeth in each jaw confluent into two, see section 25

Section

24 (23) Body compressed, stubby appears truncated behind dorsal and anal; skin rought but not spiny. Sunfish, headfish. (Family Molidae). For species, see family No. ..... ~~120~~ 124

Body not compressed, skin covered with spines which are erected by living fish, when disturbed, by puffing up or ballooning body until skin is taut. Spiny puffers. (Family Diodontidae). For species, see family No. ..... ~~121~~ 123

25 (23) Back broadly rounded. Puffers, balloon fish. (Family Tetrodontidae). For species, see family No. ..... ~~119~~ 121

Back with sharp median ridge immediately before dorsal fin. Sharpnosed puffers. (Family Canthigasteridae). For species, see family No. ..... ~~120~~ 122

26 (18) Vent normal in position; body may or may not be eel like in form, see section 27

Vent at throat; vertical fins confluent; body elongate, almost eel shaped. Pearlfish. (Family Carapidae). See family No. ..... ~~99~~ 101

27 (26) Finlets not present behind soft dorsal and anal fins, see section 28

Finlets present behind soft dorsal and anal fins. Snake Mackerels. (Family Gempylidae). For species, see family No. ..... ~~87~~ 89

28 (27) Body may or may not be elongate, but is not somewhat band or ribbon shaped, not bright aluminum or silver in color when fresh; if scaleless and elongate, caudal is confluent with dorsal and anal, see section 29

Body elongated, band shaped flattened, and scaleless; a silvery or aluminum color in fresh or living animal; caudal, when present, not confluent with dorsal and anal. Cutlass fish, Scabbard fish. (Family Trichiuridae). See family No. ..... ~~89~~ 90

29 (28) Sword not present on snout, see section 30

Sword present on snout; not round in cross-section, but flattened; length of sword, measured from eye, more than 1/2 trunk or body length; large powerful fishes of the open seas. Broadbill Swordfish. (Family Xiphiidae). For species, see family No. ..... ~~92~~ 94

Section		
30 (29)	Depth of body less than 1/5 length, see section	31
	Depth of body more than 1/5 length. (Family Stromateidae). For species, see family No.	~~106~~ 102
31 (30)	Dorsal and anal fins continuous with caudal fin, see section	32
	Dorsal and anal fins not continuous or confluent with caudal. San lanunces. (Family Ammodytidae). See family No.	~~80~~ 94
32 (31)	Body without scales; gill membranes separate and free from isthmus; enlarged fang-like teeth present. (Family Lycodapodidae) (Deep sea). See family No.	~~94~~ 99
	Single series of small scales present on body; gill membrane broadly united, but free from isthmus. Blenny eel. (Family Congrogadidae). See family No.	~~96~~ 98

KEYS TO THE SPECIES OF FISH OF SELECTED
BATHYBIAL AND ALL NONBATHYBIAL FAMILIES
FOUND IN HAWAIIAN WATERS

Section No.

Family No. 1

BRANCHIOSTOMATIDAE

The Lancelets

1 (1) A single pelagic species of this family has been reported from the Hawaiian area . . . . . Amphioxides pelagicus (Gunther)

Family No. 2

ISURIDAE

Mackerel Sharks

1 (7) Teeth triangular in shape with serrated edges. NIUHI GREAT WHITE SHARK . . . . . Carcharodon carcharias Linne.

Teeth awl-like without serated edges. BONITO SHARK . . . . Isurus glaucus (Muller & Henle).

Family No. 3

ALOPIIDAE

Thresher Sharks

1 (5) This cosmopolitan species has been taken a number of times in Hawaiian waters . . . . . Alopias vulpinus (Bonnaterre)

Family No. 4

RHINCODONTIDAE

Whale Sharks

1 (7) The single enormous, wide ranging species of this family may occur in Hawaiian waters . . . . . Rhincodon typus Smith.

Section No.

Family No. 5

SCYLIORHINIDAE

Cat Sharks

1 (6) A single species of this family is found in deep water about the Hawaiian Islands. .....
Pentanchus profundicolus (Gilbert)

Family No. 6

CARCHARHINIDAE

Sand Sharks

1 (8) No spiracles or pore present behind eye. 2

Spiracles or pore present behind eye. 9

---

2 (1) First dorsal fin insertion decidedly nearer vertical through insertion of pectoral fin than vertical through insertion of ventral fin. 3

First dorsal fin insertion about midway between vertical through insertion of pectoral fins and vertical through insertion of ventral fins or slightly nearer vertical through ventral fin insertion. GREAT BLUE SHARK. .....
Prionace glauca (Linne)

---

3 (2) Second dorsal fin smaller than anal fin 5

---

4 (3) Second dorsal fin equal to or larger than anal fin. 6

---

5 (4) Second dorsal fin insertion and anal insertion opposite; head long, going about 3 3/4 times in body length to subcaudal insertion. .....
Carcharhinus limbata (Muller & Henle)

Second dorsal fin insertion behind insertion of anal fin; head short, going about 4 to 4 1/4 times in body length from tip of snout to subcaudal insertion. .....
Carcharhinus porosus (Muller & Henle)

Section No.

6 (4) Second dorsal fin larger than anal fin, insertion of second dorsal fin may be opposite or ahead of that of anal fin. .. 7

Second dorsal fin and anal fin equal in size; insertion of second dorsal fin ahead of that of anal fin; fins sharply tipped with black. BLACKTIPPED SHARK. .....
Carcharhinus melanopterus (Quoy & Gaimard)

---

7 (6) Insertion of second dorsal fin ahead of that of anal fin. 8

Insertion of second dorsal fin opposite that of anal; head short, going about 5 1/2 times in body length to subcaudal origin, much wider than deep. .....
Carcharhinus munsing (Bleeker)

---

8 (7) Insertion of first dorsal fin opposite first fifth of pectoral fin base. .....
Carcharhinus gangeticus (Muller & Henle)

Insertion of first dorsal fin opposite inner pectoral fin angle, well behind pectoral fin base .....
Carcharhinus Isamia (Blainville)

---

9 (2) Length of head about 4 times in length of body to subcaudal insertion; 18 to 20 rows of teeth in jaws which are broad and compressed, margins finely serrated and with five small cusps. TIGER SHARK. .....
Galeocerdo cuvier (Lesueur)

Length of head about 4 3/4 times in length of body to subcaudal insertion; 44 rows of teeth in upper jaws, mostly tricuspid, outer cusps of each lateral tooth best developed. TOPE, SOUPFIN SHARK. .....
Galeorhinus galeus (Linne)

Family No. 7

TRIAKIDAE

1 (3) A single species of this family is found about the Hawaiian Islands. .....
Triaenodon obesus (Ruppell)

Section No.

Family No. 8

SPHYRNIDAE

Hammerhead Sharks

1 (8) Expansion of head at right angles to body axis; origin of first dorsal fin before hind edge of attachment of pectoral fin. .....
Sphyrna tudes (Valenciennes)

Expansion of head at slight oblique angle to body axis; origin of first dorsal fin just back of hind edge of attachment of base of pectoral fin. MANO KUHIKIHI - Common hammer head. .....
Sphyrna zygaena (Linne)

Family No. 9

SQUALIDAE

The Dogfishes

1 (10) Dorsal fin spines with lateral grooves; a notch below terminal part of caudal. 2

Dorsal fin spines without lateral grooves; caudal fin not notched subterminally below. DOGFISH. .....
Squalus suckleyi (Girard)

---

2 (1) Teeth alike in both jaws, small raptorial, with 3 sharp cusps; median cusp largest; 40 rows above. 44 below. .....
Centroscyllium nigrum Garman.

Teeth dissimilar in 2 jaws; upper erect, tricuspid, bladelike; lower very oblique, inner margin forming cutting edge; 27 rows in upper jaw, 29 in lower. .....
Etmopterus villosus Gilbert.

Family No. 10

DALATIIDAE

1 (10) Teeth not alike in both jaws, those in upper more slender; no large scattered tubercles present. 2

Teeth alike in both jaws; skin with radiated bony tubercles with a conic median spine, scattered and irregular. .....
Echinorhinus brucus (Bonnaterre)

Section No.

2 (1) First dorsal fin inserted behind middle of body, about equal in size to second dorsal fin. This pelagic shark is reported to be brightly luminous in the dark. .....
Isistius brasiliensis (Quoy & Gaimard)

First dorsal fin inserted midway between snout tip and caudal base, much smaller than second dorsal fin. .....
Euprotomicrus bispinatus (Quoy & Gaimard)

Family No. 11

DASYATIDAE

Sting Rays

1 (11) Tail, which is decidedly more than twice length of disk or body with a cutaneous fold only on lower part. .....
Dasyatis latus (Garman)

Tail, which is less than twice length of disk with a cutaneous fold both on lower and upper part. .....
Dasyatis brevis (Garman)

Family No. 12

MYLIOBATIDAE

Eagle Rays

1 (12) A single wide ranging species belonging to this family found in Hawaii. HIHIMANU EAGLE RAY. .....
Aetobatus narinari (Euphrasen)

Family No. 13

MOBULIDAE

Rays of Giant Size, Mantas

1 (12) Something of a snout present, mouth inferior; serrated caudal spine present. .....
Mobula japonica (Muller & Henle)

Mouth anterior; no serrated caudal spine present.
MANTA RAY, DEVIL FISH, BLANKET FISH. .....
Manta birostris (Walbaum)

Section No.

Family No. 14

CHIMAERIDAE

Rat Fish

1 (13) A single species from deep water found in Hawaii. RATFISH. ..... Chimaera gilberti Garman.

Family No. 15

ELOPIDAE

Ten pounder

1 (A-30) A single species. AWAAUA, AWAAWA. ..... Elops machnata (Forskal)

Family No. 16

ALBULIDAE

Ladyfishes

1 (A-32) A single species found in Hawaii. OIO. ..... Albula vulpes (Linne)

Family No. 17

CLUPEIDAE

Herrings & Sardines

1 (A-33) 19 spines and rays in dorsal fin; 53 to 55 scales in lateral series on body; 21 to 22 scales on top of back between head and dorsal fin insertion (predorsal scales). MAKIAWA. ..... Etrumeus micropus (Schlegel)

9 or 10 spines and rays in dorsal fin; 32 to 36 scales in lateral series on body; 12 to 15 scales on top of back between head and dorsal fin insertion (predorsal scales). PIHA. ..... Spratelloides delicatulus (Bennett)

Section No.

Family No. 18

ENGRAULIDAE

Anchovies

1 (A-33) A single Hawaiian species of this family. NEHU. .....
Anchovichella parrumana (Fowler)

Family No. 19

CHANIDAE

Milkfish

1 (A-32) A single species found in Hawaii. AWA. .....
Chanos chanos (Forskal)

Family No. 20

ASTRONESTHIDAE

1 (A-8) A single Hawaiian representative of this family. .....
Astronesthes lucifer Gilbert.

Family No. 21

SALMONIDAE

Salmon & Trout

1 (A-6) The species listed below belonging to this family have been introduced at one time or another into the fresh waters of Hawaii.

Of these introduced species, only one has survived and that one only through constant re-introductions. That one is the rainbow trout, sea run members of which are called steelhead.

1) Chinook Salmon Oncorhynchus tschawytscha (Walbaum)
Date of first introduction 1876, last 1929

2) Rainbow or Steelhead Trout Salmo gairdneri Richardson.
Date of first introduction 1876, last 1941. This species is well established in the Kokee area of Kauai.

Section No.

3) Loch Leven Trout Salmo trutta Linne. Date of first introduction 1935, last same.

4) Eastern Brook Trout Salvelinus fontinalis (Mitchill). Date of first introduction 1894.

The Ayu, Plecoglossus altivelis. Temminck & Schlegel, a trout-like fish belonging to family Plecoglossidae was introduced in 1925 from Japan but apparently did not survive.

Family No. 22

GONORHYNCHIDAE

Sand Eels

1 (A-28) A single, wide ranging species present in Hawaiian waters. ... Gonorhynchus gonorhynchus (Linne)

Family No. 23

AULOPIDAE

1 (A-7) A single deep water representative of this family found in Hawaiian waters. ..... Chlorophthalmus proximdens Gilbert & Cramer.

Family No. 24

SYNODONTIDAE

Lizard Fishes

1 (A-29) Anal base short, less than greatest depth of body and no more than dorsal base in length, usually less; snout pointed; vent much nearer base of caudal than base of ventrals. 2

Anal base long, greater than greatest depth of body and greater in length than dorsal base; snout blunt and head compressed; vent slightly nearer base of caudal than base of ventrals. ..... Trachinocephalus myops (Forster)

Section No.

2 (1) Teeth on palatines in a single band on each side; inner rays of ventral fins substantially longer than outer rays (150%). 3

Teeth on palatines in a double band on each side; inner rays of ventral fins about as long as outer rays. ULAE. ..
Saurida gracilis (Quoy & Gaimard)

---

3 (2) Body elongate, depth going about 6 times in standard length, jaws about equal in length. 19 to 22 scales before dorsal fin insertion. .....
Synodus variegatus (Lacepede)

Body slender, greatest depth going about 7 times in standard length; snout protruding over end of lower jaw. 17 scales before dorsal fin insertion. .....
Synodus kaianus (Gunther)

Family No. 25

PARALEPTIDAE

1 (A-12) A single deep water Hawaiian species. .....
Lestidium nudum Gilbert.

Family No. 26

ALEPISAURIDAE

Lancet fish

1 (A-5, C-8) A single species occurring in Hawaiian waters which is occasionally taken on flagline gear. HAULIULI LANCET FISH. .....
Alepisaurus aesculapius (Bean)

Family No. 27

BATHYPTEROIDAE

1 (A-4) A single deep water Hawaiian species. .....
Bathypterois longifilis (Gunther)

Section No.

Family No. 28

ATELEOPIDAE

1 (C-17) A single deep water Hawaiian species of this family. .....
Ateleopus microstylus Gilbert.

Family No. 29

CYPRINIDAE

Minnows & Carps

1 (A-18, A-24) Dorsal spines and rays 18 or more in number; an osseous spine at forepart of anal fin, ... 2

Dorsal spines and rays less than 15 in number; no osseous spine at forepart of anal fin. 3

---

2 (1) A pair of barbels present on each corner of upper lip; number of scales in lateral line between 35 and 39. Introduced, fresh water. THE CARP. .....
Cyprinus carpio (Linne)

No barbels present; number of scales in lateral line about 26. Introduced, fresh water. GOLDFISH. .....
Carassius auratus (Linne)

---

3 (1) A barbel or a pair present on each corner of upper lip; an osseous spine may or may not be present at forepart of dorsal fin, Barbus sp. Species belonging to this genus have been reportedly introduced into some fresh-water reservoirs about Honolulu. .....
Likely B. nigrofasciatus Gunther and
B. conchonius Hamilton-Buchanan.

No barbels present about mouth; no osseous spines present at forepart of dorsal or anal fins. This species has reportedly been introduced into a stream on Maui. WHITE CLOUD MOUNTAIN FISH. .....
Tanichthys albonubes Lin.

There may be other cyprinids introduced purposely or by accident discovered in the fresh waters of Hawaii.

Section No.

Family No. 30

[illegible]

Leaches

1 (A-19, A-24) A single, introduced species found in the fresh water of Hawaii. DOJO. .....
Klamuncus ansubicundatus (Grube)

Family No. 31

CLARIIDAE

Chinese Catfish

1 (A-23, A-24) A single, introduced species found in the fresh water of Hawaii. ..... OOPU KUI. .....
Clarias fuscus (Lacepede)

Family No. 32

AMEIURIDAE

Bullheads

1 (A-21) A single, introduced species reported from the fresh waters of Oahu. ....
Ameiurus nebulosus (Le Sueur)

Family No. 33

SYNAPHOBRANCHIDAE

1 (D-2) A single deep water species in Hawaiian waters. .....
Synaphobranchus brevidorsalis (Gunther)

Family No. 34

[illegible]

1 (D-9) A single deep water species in Hawaiian waters. .....
[illegible] (Zugmayer)

Section No.

Family No. 35

CONGRIDAE

Conger Eels

1. (D-7) Vertical through dorsal fin insertion passes behind or about at middle of pectoral fin length, see 4

Vertical through dorsal fin insertion passes well ahead of middle of pectoral fin length. 2

---

2 Teeth present on jaws and vomer; gape of mouth not extending beyond posterior margin of eye. 3

Teeth not present on jaws and vomer; gape of mouth extending beyond posterior margin of eye. .....
Venefica ocura Snyder.

---

3 Teeth laterally on margin of jaws uniserial and close set so as to form a cutting edge. 6

Teeth laterally on margin of jaws in several series and not so close set as to form a cutting edge. 4

---

4 Vertical through insertion of dorsal fin anterior to pectoral fin base; eye large, its diameter greater than length of snout and greater than length of gill slit. .....
Ariosoma bowersi (Jenkins)

Vertical through insertion of dorsal fin posterior to pectoral fin base; eye moderate, its diameter less than length of snout and less than length of gill slit. .....
Ariosoma gilberti (Gunther)

---

5 Corner of mouth (rictus) at or posterior to a vertical through center of pupil of eye; teeth not villiform. 6

Corner of mouth (rictus) well anterior to a vertical through center of pupil of eye; teeth in broad villiform bands; deep water species. .....
Promyllantor alcocki Gilbert & Cramer.

Section No.

6 Head length goes over 7 times in total length to caudal fin base. PUHI, UHA, AHA, WHITE EEL. .....
Conger cinereus Ruppell.

Head length goes about 5.7 times in total length to caudal fin base. .....
Conger wilsoni (Schneider)

Family No. 36

MYRTOPHIDAE

Duck Billed Eels

1 (2-9) A single Hawaiian representative of this family in deep water. .....
Metoparyctor denticulatus Gilbert.

Family No. 37

ECHELIDAE

Worm Eels

1 (2-12) Dorsal fin insertion much nearer to anus than to gill opening. 2

Dorsal fin insertion nearer to gill opening than to anus, and about one half the distance from snout to anus. .....
Muraenichthys macropterus Bleeker

2 (1) Diameter of eye goes less than twice (1.75) in snout length and is greater than length of gill opening; a vertical through insertion of dorsal fin falls ahead of anus by about the distance of the length of the snout. .....
Muraenichthys gymnopterus Bleeker

Diameter of eye goes more than twice (2.2) in snout length and is about equal to the length of gill opening; a vertical through insertion of dorsal fins fall ahead of anus by about a distance equal to the length of the mouth cleft. .....
Muraenichthys cookei Fowler

Section Ic.

Family No. 38

OPHICHTHYIDAE

Snake Eels

1 (D-5) Dorsal and anal fins present. 2

Dorsal and anal and pectoral fins absent. .....
Caecula flavigauda (Snyder)

---

2 (1) Teeth present on vomer. 3

Teeth not present on vomer. Origin of dorsal fin behind origin of pectoral fin base. .....
Stethopterus semicinctus (Lay & Bennett)

---

3 (2) Pectoral fins present. 4

Pectoral fins absent. .....
Callechelys marmoratus (Bleeker)

---

4 (3) Origin of dorsal fin forward of depressed pectoral fin tip, usually opposite or ahead of gill opening. 5

Origin of dorsal fin behind depressed pectoral fin tip. ...
Brachysomophis henshawi Jordan & Snyder.

---

5 (4) Width of pectoral fin base less than length of pectoral fin. 6

Width of pectoral fin base markedly greater than length of pectoral fin; color pattern of rounded dark spots. .....
Myrichthys maculosus (Cuvier & Valenciennes)

---

6 (5) Origin of dorsal fin about opposite pectoral fin base. ....
Ophichthus polyophthalmus Bleeker

Origin of dorsal fin further forward, about midway between posterior margin of eye and gill opening. .....
Ophichthus celamus Gunther.

Family No. 39

RAMPHOSTOMIDAE

Whip Eels

1 (D-4) A single species of this family reported from Hawaiian waters. ..... Rathbunus jamaicus (Kaup)

Family No. 40

ECHIDNIDAE

Moray Eels

1 (D-2) Some of the teeth granular or molarlike. 16

None of the teeth granular or molarlike. 2

---

2 (1) Dorsal fin, which is covered by thick skin, beginning before gill openings; anal fin covered likewise by skin, beginning immediately behind vent. 5

Dorsal and anal fins reduced to rudiments near caudal fin with which they are confluent. 3

---

3 (2) Length of tail, as measured from vent to tip, equal to or a little longer than combined length of head and trunk. . 4

Length of tail, as measured from vent to tip, much less than combined head and trunk length going 1.75 to more than 2 times in it. ..... Uropterygius tigrinus (Lesueur)

---

4 (3) Color uniformly brown without being mottled. ..... Uropterygius concolor Rüppell.

Color pattern not uniform, mottled. ..... Uropterygius marmoratus (Lacepede)

---

5 (2) Posterior pair of nostrils usually without tubes, if tubes present, these much shorter than those of anterior pair. 6

Section No.

5 (2) Posterior pair of nostrils with tubes which are much larger than those of anterior pair and short as long to much longer than eye diameter. .....
Muraenophis vardalis (Schlegel)

---

6 (5) Anterior pair of nostrils without a bilobed flap posteriorly prolonged. 7

Anterior pair of nostrils with bilobed flaps posteriorly prolonged; posterior pair of nostrils with raised membranous margins nearly equal to eye in diameter; jaws so curved as to gape open at middle with mouth completely closed. .....
Echelynassa canina (Quoy & Gaimard)

---

7 (6) Vomer with teeth. 8

Vomer toothless. .....
Gymnothorax midivomer (Gunther)

---

8 (7) Some of the teeth on central forepart of upper jaw, immediately behind peripheral series of intermaxillary teeth, slender fangs, hinged and depressible. 9

Teeth on central forepart of upper jaw, immediately behind peripheral series of intermaxillary teeth not depressible slender fangs, but conical and not longer than peripheral series. .....
Gymnothorax picta (Ahl)

---

9 (8) Maxillary teeth in two or three series, the inner one with at least 5 teeth, usually more. 15

Maxillary teeth in a single series, young sometimes with an inner anterior series, in addition to outer series, of 1 to 4 fang-like teeth that disappear with age. 10

---

10 (9) Color pattern plain, mottled or spotted, but not made up of distinct cross bands. 11

Head, trunk, and tail with distinct dark cross bands which in old specimens may be distinct only on head and dorsal part of trunk and tail. .....
Gymnothorax petelli (Bleeker)

Section No.

11 (10) A dark patch of color not about gill opening. 13

A dark patch of color about gill opening; rictus sometimes also dark. 12

---

12 (11) Head width 1/2 its length; mouth closing completely. PUHI, BROWN EEL. .....
Gymnothorax flavimarginata (Ruppell)

Head narrower, its width going 2.8 to 3.5 times in its length; lower jaw curved so that mouth does not entirely close. .....
Gymnothorax kidako (Kahlegel)

---

13 (11) Body color pattern mottled, reticulated or spotted, but not completely uniform. 14

Body color pattern uniformly dull purplish brown, often paler on belly; conspicuous narrow white margin on dorsal and anal fins. .....
Gymnothorax herpetica (Ruppell)

---

14 (13) Snout long and narrow, its depth at anterior margin of eye much less than 1.5 times eye diameter and much less than distance from anterior margin of eye to snout tip. ...
Gymnothorax undulata (Lacepede)

Snout bluntish, its depth measured at anterior margin of eye 1.5 times eye diameter or more, and little less than distance from anterior margin of eye to snout tip. .....
Gymnothorax richardsoni (Bleeker)

---

15 (9) Length of cleft of mouth goes 2 to nearly 3 times in head length. .....
Gymnothorax meleagris (Shaw)

Length of cleft of mouth goes 3.8 to 4.2 times in head length. .....
Gymnothorax tile (Hamilton Buchanan)

---

16 (1) Length of tail a little longer or equal to or not over 1/3 shorter than combined length of head and trunk; mandibulary teeth in one or two series which may be increased posteriorly to three. 17

Section No.

16 (1) Length of tail only 1/2 or even less of combined length of head and trunk; mandibulary teeth in 3 or 4 irregular rows; body with many (30 - 100) narrow white rings. .....
Echidna zebra (Shaw)

---

17 (16) Mandibulary teeth in two rows, sometimes three posteriorly; body usually marked with light and dark alternating rings, 24 to 29 in number. .....
Echidna polyzona (Richardson)

Mandibulary teeth in single row posteriorly; body usually marked with reticulated spots or numerous fine, vermiculated lines. .....
Echidna nebulosa.

Family No. 41

BELONIDAE

Needle fish

1 (A-22) Tip of lower jaw without a compressed horny appendage. 2

A compressed horny appendage present at tip of lower jaw. .....
Strongylura acuminiculata (Klunzinger)

---

2 (1) No keel present on posterior part of body. 3

A keel present on posterior part of body on side, extending to base of caudal fin. .....
Strongylura indica (Le Sueur)

---

3 (2) Gill rakers present; 13 spines and rays in dorsal fin, 17 to 19 in anal. AHA AHA, NEEDLEFISH. .....
Belone platyura Bennett.

No gill rakers present, 25 spines and rays in dorsal fin, 26 in anal. .....
Ablennes hians (Cuvier & Valenciennes)

Section No.

Family No. 42

EXOCOETIDAE

Flying Fishes

1 (A-2I) Pectoral fins reaching well beyond a vertical through insertion of ventral fins. 2

Pectoral fins short, not reaching to a vertical through insertion of ventral fins. .....
Evolantia microptera (Cuvier & Valenciennes)

---

2 (1) Pectoral fins when laid back along body reach beyond dorsal fin. 4

Pectoral fins when laid back along body do not reach beyond the dorsal fin. 3

---

3 (2) A pair of dark barbels present on tip of lower jaw. .....
Parexocoetus melanogenion (Pietschmann)

No barbels present on tip of lower jaw. .....
Parexocoetus brachypterus (Richardson)

---

4 (2) Dorsal fin rays and spines equal to, or one more or one less in number than, those of anal, base of each fin about equal in length. 5

Dorsal fin rays and spines 3 or more in number than those of anal, base of dorsal fin noticeably longer than that of anal. 8

---

5 (4) Less than 35 scales between insertion of dorsal fin and head along top of back. 6

More than 35 scales between insertion of dorsal fin and head along top of back. .....
Cypselurus rubescens (Rafinesque)

Section No.

6 (5) 11 spines and rays in dorsal fin; ventral fins blackish or with blackish markings. 7

13 or more spines and rays in dorsal fin; ventral fins pale without markings. .....
Exocoetus volitans Linne.

---

7 (6) Head wide, head width 1 1/3 in head length. .....
Cypselurus oxycephalus (Bleeker)

Head narrower, head width 1 2/3 to 1 4/5 in its length. ..
Cypselurus rondeletii (Cuvier & Valenciennes)

---

8 (4) A black spot or blotch on dorsal fin, well defined, covering about 3 inter-ray membranes. 9

Dorsal fin may or may not have black spots or blotches which, however, are not well defined as above. 10

---

9 (8) Pectoral fins with many small scattered black spots; dorsal fin spot over 8th and 11th inter-ray membranes. ...
Cypselurus atrisignis Jenkins.

Pectoral fins largely uniform blackish; dorsal fin spot over 4th to 7th inter-ray membranes. .....
Cypselurus pahiensis (Ranzani)

---

10 (8) 34 or less scales on dorsal side of body between head and dorsal fin insertion. 11

35 or more scales on dorsal side of body between head and dorsal fin insertion. 12

---

11 (10) Minute teeth present on jaws and palatines. .....
Cypselurus altipennis (Cuvier & Valenciennes)

Minute teeth present on jaws alone, none on palatines or vomer. MALOLO. .....
Cypselurus simus (Cuvier & Valenciennes)

Section No.

12 (10) Pectoral fins with blackish spots or short blackish bars. .....
Cynoglurus gollorhynus (Cuvier & Valenciennes)

Pectoral fins without blackish spots, brownish on upper surface in life. .....
Cynoglurus gregorvi Pietschmann.

Section No.

Family No. 43

HEMIRAMPHIDAE

The Halfbeaks

1 (A-22) Anal and dorsal fin insertions on same vertical, one above the other. 2

Dorsal insertion in advance of that of anal. .....
Hemiramphus brasiliensis (Linne)

---

2 (1) Length of pectoral fins less than length of head as measured from tip of upper jaw. .....
Hyporhamphus apiculus (Gunther)

Length of pectoral fins twice, more or less, than length of head as measured from tip of upper jaw. .....
Euleptorhamphus viridis (Van Hasselt)

Section No.

Family No. 44

POECILIIDAE

The Topminnows

1 (A-29) Dorsal fin with 10 or fewer rays. 3

Dorsal fin with 13 or more rays. 2

---

2 (1) A reddish lateral band on body margined above by yellow; males with a swordlike elongation of lower caudal rays; dorsal fin with 13 rays. Swordtail. .....
Xiphophorus helleri Heckel.

A number of dark, narrow lateral lines on body; males with large dorsal fin of 15 to 16 rays; lower caudal rays not elongate. Mollie. Sailfin. .....
Mollienesia latipinna Le Sueur

---

3 (1) Insertion of anal fin anterior to a vertical through insertion of dorsal fin. 5

Insertion of anal fin posterior to a vertical through insertion of dorsal fin. 4

---

4 (3) Least depth of caudal peduncle goes 5 or more times in standard length; teeth in more than a single series; dorsal fin with 9 rays, anal with 8, Female of, ...
Mollienisia sphenops (Cuvier & Valenciennes)

Least depth of caudal peduncle goes 4 or less times in standard length; teeth in single series; dorsal fin with 10 rays, anal with 9. Platy. Moonfish. .....
Platypoecilus maculatus Gunther.

---

5 (3) Insertion of dorsal fin about midway between pupil of eye and caudal fin base or nearer pupil of eye. 6

Insertion of dorsal fin nearer caudal fin base than pupil of eye. Mosquito Fish. .....
Gambusia affinis (Baird & Girard)

Section No.

6 (5) Background color of dorsal and caudal fins yellow, both fins black spotted; dorsal fin with 9 rays; often 5 to 10 narrow vertical bands on body. .....
Mollienisia sphenops (Cuvier & Valenciennes)

Background color of dorsal and caudal fins not yellow; these fins not blackspotted; dorsal fin with 7 rays; males brightly colored and spotted, much smaller than the drab females. Guppy .....
Lebistes reticulatus (Peters)

Section No.

Family No. 45

AULOSTOMIDAE

Trumpet Fish

I (A-35) A single wide ranging species taken in Hawaiian waters.
NUNU. TRUMPET FISH. .....
Aulostomus chinensis (Linne)

Section No.

Family No. 46

FISTULARIIDAE

Cornet Fishes

1 (A-17) Skin smooth; no row of median keels on back both before and behind dorsal fin. NUNU PEKE, CORNET FISH. ..... *Fistularia petimba* Lacepede.

Skin finely roughened; a row of median keels on back both before and behind dorsal fin. This species is apparently a deep water form and not common in Hawaii. .... *Fistularia villosa* Klunzinger.

Section No.

Family No. 47

MACRORHAMPHOSIDAE

Snipe Fish

1 (A-37) A single wide ranging species belonging to this family has been taken in the Hawaiian area. SNIPEFISH. ....., Macrorhamphosus yelitaris (Pallas)

Section No.

Family No. 48

CENTRISCIDAE

Shrimp Fish

1 (A-37) A single species of this family reported from Hawaiian waters. SHRIMP FISH. .....
Centriscus strigatus (Gunther)

Section No.

Family No. 49*

SYNGNATHIDAE

Sea horses and Pipe Fish

1 (D-13) Caudal fin present; head not positioned forward at approximately right angles to the body axis. 3

Caudal fin not present, tail prehensile and ending in a point; head positioned at approximately right angles to the body axis. 2

---

2 (1) Pale dots, more or less whitish, on body; head with whitish streaks; tubercles on body spiny in adult. SPINY SEA HORSE. .....
Hippocampus histrix Kaup.

No pale dots present on body which may sometimes show small dark spots and be variously colored with orange, golden, or red in life; tubercles on body not spiny. ....
Hippocampus kuda Bleeker.

---

3 (1) Lateral trunk ridge continuous with inferior tail ridge. . 4

Lateral trunk ridge subcontinuous at anal area with lateral tail ridge which continues dorsally on the side of the tail to become confluent with the superior tail ridge at about the end of the dorsal fin. BALL'S PIPE FISH. .....
Syngnathus balli (Fowler)

---

4 (3) Superior trunk ridge discontinuous with superior tail ridge with the break occurring at approximately the end of the dorsal fin. 5

Superior trunk ridge continuous with superior tail ridge without a break at approximately the end of the dorsal fin. .....
Ichthyocampus erythraeus Gilbert.

---

*This family key prepared by E. S. Herald.

Section No.

5 (4) Brood pouch under tail of male; tail rings at least one and one half greater in number than trunk rings. 6

Brood pouch under belly of male; trunk and tail rings approximately equal in number. .....
Dorvrhamphus melanopleura (Bleeker)

---

6 (5) Trunk ring count 21 to 23; anterior supraorbital crests confluent with median nasal crest. .....
Microrhamphus brachyrhinus E. S. Herald.
(M. S. name)

Trunk ring count 17 to 18; anterior supraorbital crests not confluent with median nasal crest. .....
Microrhamphus edwardsoni (Pietschmann)

Section No.

Family No. 50

LAMPRIDAE

Opah

1 (C-9) A single cosmopolitan species taken occasionally in Hawaiian waters. OPAH or MOONFISH. .....
Lampris regius (Bonnaterre)

Section No.

Family No. 51

LOPHOTIDAE

Oarfish

1 (C-16) A single species reported from Hawaiian waters. .....
Lophotes cepedi Schlegel.

Section No.

Family No. 52

POLYMIXIIDAE

1 (C-7) A single species reported from Hawaiian waters. .....
Polymixia japonica Gunther.

Section No.

Family No. 53

BERYCIDAE

1 (C-13) A single, deep water species of wide distribution in the Pacific reported from the Hawaiian area. .....
Beryx decadactylus Cuvier & Valenciennes

Section No.

Family No. 54

HOLOCENTRIDAE

Squirrel Fish

1 (C-14) A conspicuous spine at lower angle of preopercle. 8

Lower angle of preopercle without spine. 2

---

2 (1) Two dorsal fins which are not joined or are very slightly joined by fin membranes; usually 10 (occasionally 11) spines in the first and one spine and from 14 to 17 rays in the second; scales strongly ctenoid but not especially roughened. 4

A single dorsal fin composed of an anterior spinous part and a posterior rayed part, the two parts joined by fin membrane; 12 to 13 spines and 14 to 15 rays present; scales very rough. 3

---

3 (2) There are about 29 scales in the lateral line. .....
Ostichthys japonicus (Cuvier & Valenciennes)

There are about 40 to 45 scales in the lateral line. ....
Holotrachys lima (Cuvier & Valenciennes)

---

4 (2) Lateral line scales 30 to 38; dorsal soft rays 13 to 16; anal soft rays 12 to 14. 5

Lateral line scales 40 to 44; anal soft rays 15 or 16; dorsal soft rays 16 or 17. .....
Myripristis pralinius Cuvier & Valenciennes

---

5 (4) Interradial membranes between the first two softanal and usually soft dorsal rays are not white, but are dusky, yellow, or pale red; gill rakers 31 to 40. 6

Interradial membranes between the first two soft dorsal and anal rays white, with the following interradial membranes dusky on the outer portions; total number of gill rakers on the first arch 43 to 48. UU. .....
Myripristis murdjan (Forskal)

Section No.

6 (5) Third anal spine shorter than fourth; ventral fins fail to reach vent by at least 2 transverse scales; in life only dorsal interspinous membranes yellow. 7

Third anal spine reaches further back than fourth; ventral fins reach almost to vent; in life all fins conspicuously yellow. .....
Myripristis chryseres Jordan & Evermann.

---

7 (6) Bony interorbital goes from 3.6 to 3.9 times stepped into head, measured to edge of opercle but not including opercular spine; lateral line with 34 to 38 scales to caudal base, 32 to 36 scales to end of vertebral column. ...
Myripristis argyromus Jordan & Evermann.

Bony interorbital goes from 4.7 to 4.9 times in head; lateral line with 29 to 32 scales to caudal base. UU.....
Myripristis berndti Jordan & Evermann.

---

8 (1) Last dorsal spine a part of the first dorsal fin, i.e., its base is nearly equidistant from preceding spine and first soft dorsal ray. 10

Last dorsal spine forming a part of the second dorsal fin, i.e., its base is much closer to the base of the first soft ray than to the base of preceding spine; two subequal opercular spines; 3rd anal spine reaching about to caudal base. 9

---

9 (8) Scales of cheek with dark spots; dark spots on each of the scales of the upper 3/4 of body, forming longitudinal rows; dorsal soft rays 12, anal 8. .....
Holocentrus sammara (Forskal)

Scales of cheek and body without dark spots; dorsal soft rays 13, anal 9. .....
Holocentrus scythrops (Jordan & Evermann)

---

10 (8) Profile of head more or less convex. 12

Profile of head to above eye straight or slightly concave; dorsal soft rays 15 or 16. 11

Section No.

11 (10) A single enlarged opercular spine; anal fin with 11 soft rays. .....
Holocentrus ensifer Jordan & Evermann.

Two enlarged opercular spines; anal with 10 soft rays. ....
AIAITHI. .....
Holocentrus spinifer (Forskal)

---

12 (10) Maxillary not reaching vertical from center of pupil; dorsal rays 13 or 14. 13

Maxillary reaching beyond center of pupil; dorsal soft rays 13 to 16; dorsal membranes with oval light spots. ....
Holocentrus erythraeus Gunther.

---

13 (12) Longest anal spine reaching to or beyond base of caudal; ventrals reaching almost to anus. 15

Longest anal spine not reaching caudal base; ventrals failing to reach anus by 2 or more transverse scale rows. . 14

---

14 (13) The upper of the two enlarged opercular spines much larger than the lower; bony interorbital contained more than 4 times in head length; in life the sides are bright red with clear yellow stripes along the scale rows. .....
Holocentrus xantherythrus Jordan & Evermann.

The two enlarged opercular spines are of nearly equal size; bony interorbital contained about 3½ times in head length; sides plain, often with small black flecks on scales, especially in young. .....
Holocentrus lacteo-guttatus Cuvier & Valenciennes

---

15 (13) Membranes between dorsal spines mostly black, with an irregular pale band passing longitudinally between the upper and lower black areas of at least some of the membranes. AIAITHI KAHAIOA. .....
Holocentrus diadema Lacepede

Membranes between dorsal spines mostly pale. .....
Holocentrus microstomus Gunther.

Section No.

Family No. 55

GRAMMICOLEPIDAE

Paper scaled fish

1 (B-12, B-45) A single wide ranging species taken in Hawaiian waters. .... Grammicolepis brachiusculus Poey.

Section No.

Family No. 56

APOGONIDAE

Cardinal Fish

1 (B-16) First dorsal fin with 6 to 8 spines, usually seven. 3

First dorsal fin with 9 or more spines. 2

2 (1) Anal fin with 2 spines and 7 rays; second dorsal fin with 1 spine and 9 rays; scales in lateral series less than 30. ..
Synagrops japonica (Steindachner & Doderlein)

Anal fin without spines and with 15 rays; second dorsal fin without a spine and with 17 rays; scales in lateral series more than 50. .....
Ariomma lurida Jordan & Snyder

3 (1) Body robust, greatest depth of body going between 2.5 to 3.1 times in its length; scales well developed, 22 to 26 in lateral series. 4

Body slender, greatest depth of body going about 6 times in its length; scales little developed. .....
Hynnodus atherinoides Gilbert

4 (3) Third or fourth spine of first dorsal fin longest of all spines (first spine small and easily overlooked). 5

Second spine of first dorsal fin longest of all spines; body a brilliant red in life, fading to white in preservative.
Apogon erythrinus Snyder

5 (4) Caudal forked; one or both borders of preopercle serrate. ... 7

Caudal rounded; neither border of preopercle distinctly serrate. 6

6 (5) Lateral line complete .....
Apogon waikiki (Jordan & Evermann)

Lateral line incomplete, stopping under soft dorsal. .....
Apogon brachygramma (Jenkins)

7 (5) Scales above and below lateral line much smaller than lateral line scales; about 54 in a longitudinal series above lateral line. .....
Apogon evermanni Jordan & Snyder

Section No.

Scales of lateral line not enlarged in relation to those above and below; about 25 scales in the longitudinal series above lateral line. 8

8 (7) Both borders of preopercle sharply serrate; color pattern of bars on body and fins. UPAPALU. .....
Apogon frenatus Valenciennes

Only the posterior border of the preopercle sharply serrate (anterior border may be slightly serrate); color pattern of dark spots on each body scale. .....
Apogon maculiferus Garrett.

Section No.

Family No. 57

KUHLIIDAE

Mountain Bass

1 (B-57) Number of scales in lateral line 45 or less. 2

Number of scales in lateral line 50 to 55; dorsal fin with 10 spines and 11 rays; anal fin with 3 spines and 11 rays. AHOLEHOLE. .....
Kuhlia sandvicensis (Steindachner)

---

2 (1) There are 10 rays in anal fin. .....
Kuhlia rupestris (Lacepede)

There are 12 rays in anal fin. .....
Kuhlia marginatus Cuvier & Valenciennes.

Section No.

Family No. 58

CENTRARCHIDAE

Sunfishes

1 (B-56) Body is deep and flattened in shape, its greatest depth going between 1.8 to 2.3 times in the standard length (young fish are slenderer, the relative depth increasing with age); the greatest depth substantially more than length of head; the division between the first (spiny) dorsal fin and the second (softrayed) dorsal fin is not marked by a deep notch. BLUEGILL SUNFISH. .....
Lepomis macrochirus Rafinesque.

Body is not markedly deep or flattened in shape, its greatest depth going from 3 to 3.25 times in the standard length; the greatest body depth about equal to or a little less than the head length, except in very large and heavy specimens; the division between the first (spiny) dorsal fin and the second (softrayed) dorsal fin is marked by a pronounced notch. LARGE MOUTH BLACK BASS. .....
Huro salmoides (Lacepede)

Section No.

Family No. 59

SERRANIDAE

Sea Bass

1 (B-59) Dorsal fin with 9 or more spines. 2

Dorsal fin with 8 spines, deeply notched between spinous & rayed portions; a yellow stripe through eye; yellow stripes on fins; general color rosy. .....
Pikea japonica Steindachner & Doderlein.

---

2 (1) Dorsal fin with 10 or 11 spines. 3

Dorsal fin with 9 spines. 11

---

3 (2) Eye diameter less than maxillary length. 4

Eye diameter about equal to length of maxillary and about 3 times as great as the length of the short snout. .....
Grammotonotus laysanus Gilbert.

---

4 (3) Maxillary with a supplemental bone; inner teeth of jaws usually depressible or hinged; scales on body fine, 100 or more in lateral line. 12

Maxillary without a supplemental bone; inner teeth of jaws not depressible or hinged; scales on body not especially small, 75 or usually much less in lateral line. 5

---

5 (4) 3rd dorsal fin spine no longer or slightly longer than 4th. 6

3rd dorsal fin spine at least 1/4 longer than 4th; body deep, its depth going about 2.5 times in its length to caudal fin base. .....
Odontanthias fuscipinnis Jenkins.

Section No.

6 (5) Pectoral length less than head length. 8

Pectoral length greater than head length; some yellow stripes on head; general color pinkish. 7

---

7 (6) Side of body usually with yellow spots or oblique irregular stripes; snout length equal to or a little shorter than eye; posterior margin of caudal fin when spread open, slightly concave. .....
Caprodon longimanus (Gunther)

Side of body without yellow spots or stripes; length of snout a little greater than diameter of eye; posterior margin of caudal fin, when spread open, slightly convex. ...
Caprodon schlegelii (Gunther)

---

8 (6) Some of the fin rays extended, filamentous. 9

None of the fin rays extended or filamentous. 12

---

9 (8) Dorsal fin usually with 10 spines; 2nd dorsal ray not extended or not extended as long as 3rd. 10

Dorsal fin usually with 11 spines and 15 rays; 2nd soft dorsal fin ray and upper caudal fin ray extended, produced as a filament. .....
Anthias kelloggi Jordan & Evermann.

---

10 (9) First 8 dorsal fin rays extended and filamentous, 3rd longest, longer than head; outer rays of caudal fin greatly extended, longer than length of body without head. .
Odontanthias elizabethae Fowler.

12th or 13th dorsal fin rays extended into a filament; 5th anal ray likewise slightly extended; outer rays of caudal fin extended into filaments which are much shorter than length of body without head. .....
Caesioperca thompsoni Fowler.

Section No.

11 (2) Dorsal fin with 9 spines and 9 rays; anal fin with 3 spines and 7 rays; outer rays of caudal fin extended, the fin being deeply forked. .....
Symphysanodon typus Bleeker.

Dorsal fin with 9 spines and 15 or 16 rays; anal fin with 3 spines and 9 rays; outer rays of caudal fin not extended, the fin being rounded and not forked in the least. .....
Caphulophis argus Bloch & Schneider.

---

12 (4-6) Some of anterior teeth of jaws enlarged, canines; enlarged teeth of inner series of each jaw depressible, hinged. 13

No enlarged canine teeth present; inner series of teeth not depressible; total length of body may be very great (6 to 7 feet). .....
Stereolepoides thompsoni Fowler.

---

13 (12) A vertical line upward from posterior tip of maxillary passes through or just behind eye. 15

A vertical line upward from posterior tip of maxillary passes well behind eye, by almost diameter of eye or more. 14

---

14 (13) Snout length goes 4.8 to 5 times in head length; eye diameter goes 7.8 to 8.5 times in head length; usually some yellow on paired fins; dorsal fin spines short, the 3rd spine going 4.5 to 5 times in head length. JEWFISH - reaches a length of 12 feet. .....
Promicrops lanceolatus (Bloch)

Snout length goes 4.2 to 4.5 in head length; eye diameter goes 5.4 to 7.4 in head length, fins and body often covered with small dark spots, smaller than eye; 3rd dorsal fin spine goes 3 to 3.75 times in head length. .....
Serranus tauvina (Forskal)

---

15 (13) Body rather deep, its greatest depth going between 2.4 and 2.6 times in its length to base of caudal fin; there are 15 or fewer rays present in soft dorsal fin. 16

Body more slender, its greatest depth going about 3 times in its length to base of caudal fin; there are 17 rays present in soft dorsal fin; pectoral and soft dorsal fins edged with yellow. .....
Serranus dictiophorus Bleeker.

Section No.

16 (15) Pale spots scattered over body; snout little wider than long; 14 rays in soft dorsal fin. HAPUUPUU. .....
Epinephelus guernus (Seale)

No pale spots on body; snout width 3/4 its length; 15 rays in soft dorsal fin. .....
Serranus sentcufasciatus (Thunberg)

Section No.

Family No. 60

PSEUDOCHROMIDAE

1 (B-58) A single wide ranging species reported from Hawaiian waters. ..... Pseudograma polyacanthus (Bleeker)

Section No.

Family No. 61

PRIACANTHIDAE

Big Eye

1 (B-58) Ventral fins not as long as head. 2

Ventral fins as long as or longer than head. .....
Priacanthus boops (Schneider)

---

2 (1) Anal fin usually with 3 spines and 14 rays, last ray may be split; ventral fin not dusky but pale; caudal fin truncate or slightly emarginate. 3

Anal fin usually with 3 spines and 15 or 16 rays, ventral fin dusky; caudal fin crescentic in adults, the outer lobes produced with age. ALALAUA. .....
Priacanthus hamrur (Forskal)

---

3 (2) A strong flattened spine at preopercle angle; caudal fin with small scattered dark spots on the membrane. AWEOWEO. .
Priacanthus cruentatus (Lacepede)

Preopercle angle with a broadly triangular spine in young, an obtuse spineless angle in adult; caudal fin without small scattered dark spots on the membrane. .....
Priacanthus macracanthus Cuvier & Valenciennes.

Section No.

Family No. 62

LUTIANIDAE

Snappers

1 (B-62, B-63) Vomer & palatines with teeth. 3

Vomer & palatines toothless; teeth in jaws very small, disappearing with age. 2

---

2 (1) Gill rakers 5 / 16 to 18. .....
Aphareus furcatus (Lacepede)

Gill rakers 16 to 19 / 32 to 34. .....
Aphareus rutilans Cuvier & Valenciennes

---

3 (1) Body color pattern without 4 broad diagonal yellow bands on dorsal half. 4

Body color pattern with 4 broad diagonal yellow bands on dorsal half, last one extending posteriorly to yellow patch covering caudal peduncle and much of caudal fin; color other-wise largely pinkish. .....
Tropidinius zonatus (Cuvier & Valenciennes)

---

4 (3) Dorsal fin deeply notched between spinous and soft rayed portions. 9

Dorsal fin not notched. 5

---

5 (4) Pectoral fins longer than ventral fins, almost as long as or sometimes longer than head. 6

Pectoral fins much shorter than ventral fins. UKN. .....
Aprion virescens Valenciennes

---

6 (5) Dorsal fin rays 11 or less in number; more than 55 scales in lateral line. 7

Dorsal fin rays 13 to 14 in number; from 47 to 50 scales in lateral line. .....
Lutianus vaigiensis (Quoy & Gaimard)

Section No.

7 (6) Gill raker 8 / 18 or more in number. 8

Gill rakers 5 / 12 or 13 in number. .....
Pristipomoides microdon (Steindachner)

---

3 (7) Gill rakers 8 / 18; dorsal fin with 10 spine and 10 rays; maxillary reaches a vertical through eye at anterior margin of pupil. OPAKAPAKA. .....
Pristipomoides microlepis (Bleeker)

Gill rakers 10 to 11 / 20; dorsal fin with 10 spines and 11 rays; maxillary reaches a vertical through or before anterior margin of eye. KALIKALI. .....
Pristipomoides filamentosus (Cuvier & Valenciennes)

---

9 (4) Gill rakers 6 / 10 to 12; caudal fin moderately forked, its outer rays about the same or less than the length of head. .....
Etelisous marshi Jenkins.

Gill rakers 10 to 13 / 14 to 17; caudal fin deeply forked, its outer rays extended; longer than the head length by more than eye diameter. .....
Etelis carbunculus Cuvier & Valenciennes.

Section No.

Family No. 63

LETHRINIDAE

1 (B-63) A single wide ranging species reported from Hawaiian waters. ..... Lethrinus leutianus (Lacepede)

Family No. 64

SPARIDAE

Porgy

(B-65) Molar teeth in jaws in a single row; dorsal fin with 10 spines and 10 rays; anal fin with 3 spines and 9 rays; general color greyish brown frequently with 3 narrow transverse light bands across body. MU. .....
Monotaxis grandoculis (Forskal)

Molar teeth in jaws in two or 3 upper rows and 2 lower rows; dorsal fin with 11 or 12 spines and 10 rays; anal fin with 3 spines and 8 rays; no light transverse bands on body. RED TAI. .....
Chrysophrys major Schlegel.

ction No.

Family No. 65

KYPHOSIDAE

Rudder Fish

(B-54) Caudal fin not deeply emarginate, middle caudal rays more than 1/3 length of the outer ones; greatest body depth goes only 2.4 times or less (2.0 to 2.4) in body length to caudal fin base. 2

Caudal fin deeply emarginate, middle caudal rays about 1/3 length of outer caudal rays; greatest body depth goes about 3 times in body length to caudal base. .....
Sectator azureus Jordan & Evermann.

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(1) Dorsal fin with 11 or 12 spines and 12 rays; anal fin with 3 spines and 11 rays. MENUE. .....
Kyphosus bigibbus Lacepede.

Dorsal fin with 11 spines and 14 rays; anal fin with 3 spines and 13 rays. .....
Kyphosus lembus (Cuvier & Valenciennes)

Section No.

Family No. 66

HISTIOPTERIDAE

Boar Fish

1 (B-49) A single species found in Hawaiian waters. .....
Histiopterus typus Schlegel.

Family No. 67

EMMELICHTHYIDAE

1 (B-25) A single species found in Hawaiian waters. .....
Emmichthys schlegeli (Richardson)

Family No. 68

GREGORYINIDAE

1 (B-52) A single species known in this family. .....
Gregorycina gygis Fowler and Ball.

Section No.

Family No. 69

OPLEGNATHIDAE

Beaked Rudder Fish

1 (B-64) A single species in Hawaiian Waters. ..... Oplegnathus fasciatus (Schlegel)

Section No.

Family No. 70

MULLIDAE

Goatfish - Surmullets

1 (B-8) Teeth present on both jaws, and on vomer and palatines. 17

Teeth present on jaws alone, sometimes few on palatines, none on vomer. 2

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2 (1) Teeth on jaws present in one or two rows only, not in bands. . 8

Teeth on jaws present in more than two rows or in villiform bands. 3

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3 (2) A median lateral band, usually yellow in color, present from head to caudal fin base; other lateral bands may be present, but no transverse color markings. 4

No median yellow lateral band present, or if faintly present, there are transverse color markings. 6

---

4 (3) Other lateral bands present on sides, one usually above and three below the median lateral band; usually a dark spot on side beneath pectoral fin tip when laid back. WEKE.
Mulloidichthys samoensis (Gunther)

A single lateral band present on body; no dark spot on side beneath pectoral fin tip. 5

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5 (4) Yellow lines, other than lateral band, present on head; 42 or 43 scales in lateral line; eye large 3.33 times in head length. .....
Mulloidichthys erythrinus (Klunzinger)

No yellow lines on head; 40 scales in lateral line; eye 3.5 or more times in head length. WEKE ULA. .....
Mulloidichthys auriflamma (Forskal)

Section No.

6 (3) Body, in life, with 5 broad transverse bands; .....
Mulloidichthys flavolineatus (Jordan & Evermann)
Body without transverse bands. 7

---

7 (6) Snout long, half or more of head length. .....
Mulloidichthys vflugeri (Steindachner)

Snout short, going 2.5 to 2.75 times in head length. .....
Mulloidichthys vanicolensis (Cuvier & Valenciennes)

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8 (2) Body side with at least one black spot. 9

Body side without black spots, may be dark saddle on caudal peduncle. 14

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9 (8) Body with black cross bands. 13

Body without black cross bands. 10

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10 (9) Black spot above end of pectoral fin, followed by pale blotch below soft dorsal fin; 3 scale rows below eye, between it and edge of opercle. MALU. .....
Pseudupeneus pleurostigma (Bennett)

No black spot above end of pectoral fin; a black spot on side of caudal peduncle. 11

---

11 (10) Black spot about size of eye mostly above lateral line and midway along caudal peduncle. 12

Black spot centered on lateral line and nearer base of caudal fin; 13 scales between first dorsal fin insertion along back forward to nostril. .....
Pseudupeneus barberinus (Lacepede)

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12 (11) A parallel white band above and below dark postocular band. .
Pseudupeneus fraterculus (Cuvier & Valenciennes)

No parallel white band above and below dark postocular band..
Pseudupeneus macronemus (Lacepede)

Section No.

13 (9) Side of body immediately beneath base of first (spiny) dorsal fin with a broad blackish brown transverse band; a second similar band beneath second (soft) dorsal fin; a third on hind half of caudal peduncle. KUMU. .....
Pseudupeneus bifasciatus (Lacepede)

Side of body immediately beneath base of first (spiny) dorsal fin with a broad yellowish white transverse band closely followed by transverse dark band lying beneath posterior part of first (spiny) and second (soft) dorsal fins; 4 or 5 dark transverse bands may be present altogether. MOANO. .....
Pseudupeneus multifasciatus (Quoy & Gaimard)

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14 (8) A light spot or saddle, which may be divided into two, immediately behind 2nd dorsal fin on caudal peduncle either white or yellow in color. 15

No light colored spot or saddle behind 2nd dorsal fin; general color largely crimson; scales on back below dorsals edged black; barbels and vertical fins yellow; soft dorsal and anal fins with horizontal blue lines. .....
Pseudupeneus chrysopomus (Jordan & Evermann)

---

15 (14) Scales margined with greenish in life; a dark postocular band present from behind eye to end of second dorsal fin on side with parallel whitish bands above and below this. ...
Pseudupeneus fraterculus (Cuvier & Valenciennes)

No greenish margined scales in life; a faint postocular band margined above and below by whitish bands sometimes present. 16

---

16 (15) The light colored spot behind second dorsal fin whitish, may be two separate spots, general body color reddish or pinkish when fresh, ventral fins reddish. KUMU. .....
Pseudupeneus porphyreus Jenkins.

The light colored spot behind second dorsal fin yellow or golden; dorsal part of body a dull leaden or purplish color; ventral fins not reddish. .....
Pseudupeneus chrysaydros (Lacepede)

Section No.

17 (1) Large triangular reddish blotch at caudal fin base; head short, going about 4.75 to 5 times in standard length. .....
Upeneus tragulopterus Cuvier & Valenciennes

No large reddish triangular blotch at caudal fin base; head longer, going about 3.4 to 3.75 times in standard length. WEKE PUEO. .....
Upeneus arge Jordan & Evermann.

Section No.

Family No. 71

MALACANTHIDAE

Whitefish

1 (B-38) A single species in Hawaiian waters. .....
Malacanthus hoedtii Bleeker.

Section No.

Family No. 72

PARAPERCIDAE

1 (B-18, B-38) A single dorsal fin present which may or may not be notched. 5

Two dorsal fins present, first composed of spines, second of rays. 2

---

2 (1) Ventrals short, not reaching insertion of anal fin when laid back; first dorsal fin with 6 spines present. 3

Ventral fins long, reaching beyond insertion of anal fin when laid back; first dorsal fin with 5 spines present; 17 rays in second; 22 rays in anal fin. .....
Pteropsaron incisum Gilbert.

---

3 (2) Length of snout about equal to or less than diameter of eye; second dorsal fin with 16 rays. 4

Length of snout greater than eye diameter by over 1/2 of eye diameter; second dorsal fin with 14 rays. .....
Bembrops filifera Gilbert.

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4 (3) Anal fin with 24 rays. .....
Chrionema chryseres Gilbert.

Anal fin with 18 rays. .....
Chrionema squamiceps Gilbert.

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5 (1) Dorsal fin notched, and with 6 spines and 21 rays present; anal fin with 18 rays; caudal fin deep forked in adult. ..
Parapercis schauinslandii (Steindachner)

Dorsal fin not notched, and with 4 or 5 spines and 23 rays present; anal fin with 20 rays; caudal fin not forked, but truncate and rounded. .....
Neopercis roseviridis Gilbert.

Section No.

Family No. 73

TRICHONOTIDAE

Sandfish

1 (B-31) Pectoral fin small, less in length than snout; eye very small, its diameter going 10 to 12 times in head length; anal fin with 13 or 14 rays its base decidedly shorter than base of dorsal fin which has 19 or 20 rays. .....
Kraemeria bryani Schultz.

Pectoral fin more in length than snout; eye diameter moderate going 5 to 6 times in head length; anal fin with 34 or 35 rays its base about as long as that of dorsal fin which has 35 or 36 rays. .....
Crystallodytes cookei Fowler.

Section No.

Family No. 74

CHEILODACTYLIDAE

Manila Fish

1 (B-43) A single Hawaiian species. ..... *Cheilodactylus vittatus* Garrett.

Section No.

Family No. 75

CIRRHITIDAE

Hawkfish

1 (B-43) No dark spot on body just below 8 to 10 ray of dorsal fin as large as eye; no similar dark spot on upper part of opercle behind preopercle. 2

A dark spot on body just below 8 to 10 rays of dorsal fin as large as eye; a similar dark spot on upper part of opercle behind preopercle. .....
Paracirrhites bimacula (Jenkins)

---

2 (1) Scales on cheeks as large as those on body. 3

Scales on cheeks smaller than those on body; side of head covered by irregular brownish bars; reddish spots on ventral fins and body. POOPAA. .....
Cirrhitus pinnulatus (Schneider)

---

3 (2) There are about 11 soft dorsal rays; color pattern on body in longitudinal stripes. 4

There are 14 soft dorsal rays; color pattern on body not in longitudinal stripes; body with about 4 broad white cross bars alternating with the same number of broader red cross bars, the red bars narrowest ventrally, the white, dorsally; narrow red lines under jaw and on throat. .....
Paracirrhites cinctus (Gunther)

---

4 (3) Head thick set with small brownish red spots; a broad white longitudinal band on side with a black one above it posteriorly; no olive brown spot back of eye bordered by an orange line. HILU PILIKOA. .....
Paracirrhites forsteri (Bloch & Schneider)

Head not thick set with small brownish red spots; a pale whitish band below soft dorsal fin on posterior part of body; an olive brown spot back of eye bordered by an orange line. PILIKOA. .....
Paracirrhites arcatus (Cuvier & Valenciennes)

Section No.

Family No. 76

CARANGIDAE

Ulua or Jacks

1 (B-11, B-19, B-32) Lateral line not armed with scutes. 22

Lateral line armed with scutes. 2

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2 (1) One or several finlets present behind soft dorsal and anal fins. 19

No finlets present behind soft dorsal and anal fins. 3

---

3 (2) Shoulder girdle which forms the posterior margin of the gill opening not crossed with a deep furrow at its junction with the isthmus; no flesh projection above this furrow. . 4

Shoulder girdle crossed with a deep furrow at its junction with the isthmus, above which is a fleshy project. Adult: AKULE. Young: HALALALU. .....
Selar crumenophthalmus (Bloch)

---

4 (3) Anterior dorsal and anal fin rays much less than length of body which is much less in depth than the standard length usually less than 1/2. 6

Anterior dorsal and anal fin rays elongate, not less than length of body which is deep and compressed, its depth being about as great to more than 1/2 as great as its standard length. 5

---

5 (4) Depth of preorbital not more than diameter of eye; gill rakers long and slender. ULUA KIKIKIHI. .....
Alectis ciliaris (Bloch)

Depth of preorbital much greater (nearly twice) than diameter of eye; gill rakers short and stout. .....
Alectis indica (Ruppell)

Section No.

6 (4) Number of soft rays in posterior dorsal fin 27 or more. ... 17

Number of soft rays in posterior dorsal fin 25 or less. ... 7

---

7 (6) Number of soft rays in anal fin 21 or less. 8

Number of soft rays in anal fin 23; 28 scutes on posterior straight portion of lateral line. .....
Carangoides equula (Schlegel)

---

8 (7) Breast completely scaled. 11

Breast not scaled, except in some cases a small patch before ventral fins. 9

---

9 (8) Mouth cleft opening on a level or nearly so with eye, at an angle to horizontal axis of body. 10

Mouth cleft opening not on a level with eye, nearly parallel to horizontal axis of body; old adults at least without any spiny dorsal fins; no dark spot on upper portion of opercle; anal fin 16; dorsal 19. WHITE UKUA. .....
Carangoides ajax Snyder.

---

10 (9) A small dark spot at upper edge of gill opening; scutes and scales in straight portion of lateral line number 33 to 37. .....
Caranx carangus (Bloch)

No dark opercular spot; scutes and scales in straight portion of lateral line number 27 to 30. PAUU. .....
Caranx ignobilis (Forskal)

---

11 (8) Lower jaw not inferior, equal or greater in length than upper jaws with teeth. 13

Lower jaw inferior, or if but slightly inferior, there are no teeth in jaws. 12

Section No.

12 (11) No teeth in jaws; no opercular blotch; body with 8 to 12 transverse blackish bands; 18 to 21 rays in 2nd dorsal; 16 to 17 rays in anal. PAOPAO. .....
Gnathanodon speciosus (Forskal)

A single row of teeth in jaws; a dark blotch on upper opercular edge; no transverse bands on body; lips thick and rubbery; 24 rays in 2nd dorsal; 21 rays in anal. .....
Caranx cheilio Snyder

---

13 (11) Body without numerous small black spots; occasionally seven, usually eight dorsal spines in 1st dorsal. 14

Body with numerous small dark spots; in life color on back bluish; 7 spines in first dorsal fin. OMILU. .....
Caranx stellatus Eydoux & Souleyet

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14 (13) 11 to 14 plus 28 to 32 gill rakers on upper and lower portion of first gill arch. 16

7 to 8 plus 1, plus 17 to 19 gill rakers on upper and lower portion of first gill arch. 15

---

15 (14) Posterior straight portion of lateral line begins beneath a vertical from 4th to 6th ray in 2nd dorsal fin; with from 30 to 38 scutes and scales; posterior ends of maxillary beneath a vertical through posterior portion of eye in adult; young often with 5 to 7 broad dark bands; often a small blotch at upper opercular edge. ULUA. .....
Caranx sexfasciatus Quoy & Gaimard

Posterior straight portion of lateral line begins beneath a vertical through 3rd ray of 2nd dorsal fin; 40 to 45 scutes and scales in it; posterior edge of maxillary beneath a vertical through anterior half of eye or anterior edge of pupil in adult; anal tip black in life.
Caranx melampygus Cuvier

---

16 (14) Last dorsal and anal fin rays a little separated from the rest, finlet-like; maxillary reaches just to or falls a little short of a vertical through the anterior margin of the eye. OMAKA. .....
Alepes mate (Cuvier & Valenciennes)

Section No.

16 (14) Last dorsal and anal fin rays not separated to any noticeable extent from the rest, not finlet-like; maxillary reaches beyond a vertical through anterior margin of eye by about 1/3 diameter of eye. .....
Caranx kalla Cuvier & Valenciennes

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17 (6) All of tongue and anterior part of mouth not dead white in color, becoming black posteriorly; anal fin with 24 to 27 rays; first dorsal with 7 or 8 spines. 18

All of tongue and anterior portion of mouth dead white in color, becoming black posteriorly; anal fin with 22 to 23 rays; first dorsal with 5 spines. .....
Caranx helvolus (Bloch)

---

18 (17) Body oblong, greatest depth 2.4 to 2.7 in total length; head as long as high; gill rakers 9 + 1 + 17 or 22, totaling 27 to 32 on first gill arch. .....
Carangoides ferdau (Forskal)

Body elongate, greatest depth 3 to 4 times in total length; head longer than high; last dorsal and anal ray finlet like, prolonged; gill rakers 7 to 15, totaling 22. .....
Carangoides gymnostethoides Bleeker

---

19 (2) A single finlet present posteriorly to both soft dorsal and anal fins, scutes in lateral line not numerous (25 to 36) or especiallylarge, extending only under the posterior 1/3 or 2/3 of second dorsal fin, not reaching first. 20

6 to 10 finlets present posteriorly to soft dorsal and anal fins; scutes in lateral line numerous (53-58) and broad extending under base of first dorsal fin. .....
Megalaspis cordyla (Linne)

---

20 (19) Black opercular spot extends on to humeral arch behind; 35 to 36 scutes in lateral line; pectoral fins as long as head.
Decapterus maruadsi (Temminck & Schlegel)

Black opercular spot confined to opercles, not extending on to body behind; about 25 scutes in lateral line; pectoral fins much less than length of head. OPELU. .....
Decapterus pinnulatus (Eydoux & Souleyet)

Section No.

21 (1) Body rather elongate, its greatest depth between 3.3 to more than 4 times its length; a black blotch anteriorly on soft dorsal fin. 22

Body rather deep, its greatest depth going about 3.5 times into its length; soft dorsal fin dusky without a black blotch. .....
Scomberoides tala (Cuvier & Valenciennes)

---

22 (21) Some dark spots may be above but none below lateral line; scales rhombic in shape, their width going 2. to 2.5 in their length. IAI. .....
Scomberoides lysanrah (Ruppell)

Dark spots present both above and below the lateral line; scales lanceolate and narrow in shape, pointed in the exposed part. IAI. .....
Scomberoides sancti-petri (Cuvier & Valenciennes)

Section No.

Family No. 77

SERIOLIDAE

Amberjacks

1 (B-19) Dorsal and anal fins without a two rayed detached finlet behind. 2

Dorsal and anal fins with a two rayed detached finlet behind. KAMANU, Rainbow Runner. HAWAIIAN SALMON. .....
Elagatis bipinnulatus (Quoy & Gaimard)

---

2 (1) Rays in second dorsal fin more than 30 in number, membranes present between spines of first dorsal fin; body without 6 or 7 dark cross bands. 3

Rays in second dorsal fin 28 or less in number; in adult no membranes present between spines of first dorsal fin; body with 6 or 7 dark cross bands. PILOT FISH. .....
Naucrates ductor (Linne)

---

3 (2) Gill rakers on lower arch few, 15 or less in number; not over 33 rays in second dorsal fin. KAHALA. .....
Seriola dumerili (Risso)

Gill rakers on lower arch about 22 in number; over 34 rays in second dorsal fin. KAHALA OPIO. .....
Seriola aureovittata Schlegel.

Section No.

Family No. 73

CORYPHAENIDAE

Dolphins

1 (B-35) Dorsal fin with 57 rays; anal fin with 27; reaches a length of 4 or 5 feet. MAHIMAHI. .....
Coryphaena hippurus Linne.

Dorsal fin with 51 to 55 rays; anal fin with 24 to 26; reaches a length of less than 3 feet. .....
Coryphaena equisetis Linne.

Section No.

Family No. 79

BRAMIDAE

Pomfrets

1 (B-35) Pectoral fin length much less than greatest depth of body, going 1.5 times or more in greatest body depth. 2

Pectoral fin length approximately equal to greatest body depth; vomerine and palatine teeth present. .....
Taractes steindachneri (Doderlein)

---

2 (1) Dorsal and anal fin with falcate lobes at insertion, dorsal fin lobes about 4 times as long as succeeding rays; from 80 to 95 scales in lateral line. .....
Brama raii (Bloch)

Dorsal and anal fin without falcate lobes at insertion, initial dorsal fin spines and rays somewhat longer than those following, a little more than twice; about 59 scales in the lateral line. .....
Collybus drachme Snyder.

Family No. 80

CICHLIDAE

L (B-49) A single species have been established in ~~the~~ Some fresh water areas on Oahu (1950). This species is characterized by a green-edged spot at the base of the gill plate and a fiery orange color along the belly, ~~and~~ which extends into the mouth. Adult fish grows to a length of about 4 inches. .....
Cichlasoma meeki (Brind).

Many species of this family have been used as aquarium fishes and these species may establish themselves in the fresh water areas if released.

Section No.

Family No. 81
POMACENTRIDAE

1 (B-48) Preopercle not serrated 6

Preopercle serrated 2

2 (1) Upper and lower anterior margins of caudal fin without free spines 5

Upper and lower anterior margins of caudal fin with free spines 3

3 (2) Second and third dorsal spines about equal in length, see section 4

Second and third dorsal spines not equal in length, second about two thirds length of third; body color white or yellowish with three black cross bands, the first two oblique. This species is not common in Hawaiian waters. .....
Dascyllus aruanus (Linne)

4 (3) Caudal fin slightly forked, the middle shortest rays about two thirds of the length of the outer longest rays; young with two dark almost transverse bands; a dark blotch generally present at upper pectoral fin insertion; background color generally brownish. This species is rare in Hawaiian waters. .....
Dascyllus marginatus (Ruppell)

Caudal fin very slightly emarginate, the middle shortest rays more than two thirds of the length of the longest outer rays; young with a light spot at the nape and a large light oval or oblong blotch on the upper part of the side, the spot on the nape disappearing with age while that on the side frequently remains; background color generally blackish. This species is common about the Hawaiian Islands.....
Dascyllus albisella Gill

5 (2) Dorsal fin with 12 spines, opercles with three oblique rows of scales; a dark spot at the base of the last dorsal fin rays and another dark spot at upper pectoral fin insertion. This species is not common in Hawaiian waters. .....
Pomacentrus nigricans (Lacepede)

Section No.

5 (2) Dorsal fin with 13 spines, opercles with two oblique rows of scales; a dark hind border is present on the body scales; pectoral axil is black. This is a common shallow water species .....
Pomacentrus jenkinsi Jordan & Evermann

6 (1) There are 13 or more spines in the dorsal fin. 10

There are 12 spines in the dorsal fin. 7

7 (6) There are 13 or more rays in the soft dorsal fin. ... 8

There are 12 rays in the soft dorsal fin; anterior three fourths or more of body dark in color and its posterior one fourth or less abruptly white. ....
Chromis dimidiatus (Klunzinger)

8 (7) There are 16 or fewer rays in soft dorsal fin. 9

There are 19 rays in soft dorsal fin; body color pattern with two light vertical bands, one beginning beneath the third dorsal fin spine, the next beneath the last dorsal fin spine; a dark ocellus present at upper posterior part of last band in young (50 mm) .....
Chromis sindonis (Jordan and Evermann)

9 (8) Greatest depth of body goes 2 or fewer times in the standard length; a single light oblique band across body beginning beneath the sixth and seventh dorsal fin spines; a dark ocellus present beneath the base of the two final dorsal fin spines. .....
Abudefduf leucozonus Bleeker

Greatest depth of body goes more than two times in the standard length; body color olive on back, lighter underneath, but without a distinctive color pattern except for a slightly oblique dark bar across eye, not extending to head. .....
Abudefduf imparipennis (Vaillant)

10 (6) There are 13 spines in the first dorsal fin. 12

There are 14 spines in the forst dorsal fin. 11

Section No.

11 (10) There are 13 or 14 rays in the soft dorsal fin; body deep, its greatest depth is more than one half the standard length; tail moderately forked, the midcaudal rays one half or somewhat more than one half the length of the outer caudal rays. .....
Chromis verater Jordan & Metz

There are 11 rays in the soft dorsal fin; the greatest depth of body is less than one half the standard length; tail well forked, the midcaudal rays less than one half the length of the outer caudal rays. .....
Chromis ovalis (Steindachner)

12 (10) The first spine of the dorsal fin is more than one half of the length of the third. 14

The first spine of the dorsal fin is less than one half of the length of the third. 13

13 (12) Upper part of caudal peduncle with a distinct black spot which does not extend on to the last soft dorsal fin rays; six dark, more or less distinct and regular vertical bands on side, not extending up on the dorsal fin. KUPIPI. .....
Abudefduf sordidus (Forskal)

Side of body with five distinct vertical, bluish black bars which extend on to the dorsal fin and fade out on the ventral surface of the body. MAOMAO. .....
Abudefduf abdominalis (Quoy & Gaimard)

14 (12) Color pattern not uniformly dusky brown or black; greatest depth is nearly one half or less than one half the standard length. 15

Body color pattern without bars or stripes, coloration dusky brown or black; eye often with a narrow yellow ring about it; greatest depth is one half or more than one half of the standard length. .....
Abudefduf melas (Cuvier & Valenciennes)

15 (14) Body not marked with two or three light vertical bands. 16

Body marked with two or three light vertical bands, first, if present, immediately behind head, origin of second beneath fifth to seventh dorsal fin spines, last across caudal peduncle. Questionably, a part of the Hawaiian fauna. .....
Abudefduf amabilis (De Vis)

Section No.

16 (15) Predorsal scales 14 or 15 in number; head length goes 3.5 or fewer times in standard length. 17

Predorsal scales 16 to 19 in number; head length goes 4 or more times in standard length. Possibly not found in Hawaiian waters. .....
Abudefduf leucopomus (Cuvier & Valenciennes)

17 Greatest depth of body goes 2.5 or fewer times in the standard length; young with an ocellus as large as eye with a black center and narrow blue margin located at the base of the last four dorsal fin spines; small blue dots over body, forming lines on ventral surface; a small black spot at base of last dorsal fin rays. Reports of Hawaiian occurrence probably in error. .....
Abudefduf biocellatus (Quoy & Gaimard)

Greatest depth of body goes 2.8 or more times in the standard length; a light longitudinal band through dorsal fin; a narrow dark edge to tip of upper lobe of caudal fin; body color largely blue with some small yellow dots. Occurrence in Hawaiian water dubious. .....
Abudefduf uniocellatus (Quoy & Gaimard)

Section No.

Family No. 82

LABRIDAE

Wrasses

1 (B-9, B-63) Eight to nine dorsal spines, seldom ten. 7
Eleven to thirteen dorsal spines. 2

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2 (1) Lateral line continuous..... 3

Lateral line interrupted; dorsal with 11 to 12 spines and 9 to 10 rays; preopercle finely denticulated; two rows of scales on cheek. .....
Cirrhilabrus solorensis Bleeker.

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3 (2) Upper lip normal, exposed when mouth is closed; dorsal with 12 spines and 9 to 11 rays; anal with 3 spines and 10 to 13 rays. 4

Upper lip normal, covered when mouth is closed; dorsal with 8 spines and 7 rays; anal with 3 spines and 8 to 9 rays. .....
Choerodon anchorago (Bloch)

---

4 (3) Body without large black spot at base of soft dorsal or on side. 5

Body with black spot at posterior base of soft dorsal; head with dark horizontal stripes through and above eye; young with spot covering body between dorsal and anal base; top of head clear yellow. A'AWA. .....
Bodianus bilunulatus (Bloch and Schneider)

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5 (4) Vertical fins with black blotches or blotch or spots. ... 6

Vertical fins without black blotches or spots; a small black spot at caudal base and a larger one on opercle; entire anal blood red in life. .....
Verriculus sanguineus Jordan and Evermann.

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6 (5) A black blotch between seventh and ninth dorsal spines on fin membrane. .....
Bodianus oxycephalus (Bleeker)

Section No.

6 (5) A dark spot covering the fin membrane of the second and third dorsal spines. .....
Bodianus modestus (Garrett)

---

7 (1) Lateral line continuous.[4] 20

Lateral line interrupted. 8

---

8 (7) Scales large, about 20 to 30 in lateral line. 9

Scales small, about 80 in lateral line; first and second dorsal spines are flexible. .....
Cymolutes lecluse (Quoy and Gaimard)

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9 (8) First and second dorsal spines pungent and rigid like those following. 17

First and second dorsal spines flexible; body compressed. . 10

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10 (9) Profile of snout not turned abruptly downward at approximately 90 degrees to body axis; first and second dorsal spines may or may not be produced but not remote from those following; and connected with them by a membrane which is not lower than that between the other spines; head may or may not be keeled. 15

Profile of snout turned abruptly downwards at approximately 90 degrees to body axis in adult; first and second dorsal spines usually produced and remote from those following, with membrane connecting them with remaining spines either low or absent; head keeled. 11

---

11 (10) Few if any scales on cheeks; first and second produced dorsal spines clearly form a separate fin with origin above eye; not connected with remainder of dorsal spines by membrane. 14

Cheek with several rows of scales; first and second dorsal produced spines not forming separate fin with origin above eye but usually connected with remainder of dorsal spines by low membrane. 12

---

4. The lateral line may appear to be interrupted in Anampses which has large flattened incisor teeth at fore part of jaws.

Section No.

12 (11) Scales on cheek reaching from below eye downwards to behind corner of mouth. 13

Scales on cheek, by far, not reaching down to behind corner of mouth. .....
Hemipteronotus anaitensis (Gunther)

---

13 (12) Generally a large dark blotch completely below lateral line and above tip of pectorals; anterior scales of lateral line generally with a black spot or a white spot with a black center. .....
Hemipteronotus pentadactylus (Linne)

A black blotch below last posterior portion of spinous dorsal fin across lateral line; male with dark spot on last four or five anal rays. .....
Hemipteronotus melanonus (Bleeker)

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14 (11) Body color nearly uniform black without any trace of vertical bands. .....
Iniistius niger (Steindachner)

Body color olive green with three or four darker vertical bands; fading with age dark spot on side below fourth dorsal spine. .....
Iniistius pavo (Cuvier & Valenciennes)

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15 (10) Head not keeled; cheeks with fine rows of scales. 16

Head keeled; cheeks practically naked. .....
Xyrichthys virens (Cuvier & Valenciennes)

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16 (15) None of the dorsal spines filamentous; color brown, excepting head; anal of pectoral and a crescentic row of scales underneath that fin black; basal part of caudal light, distal part dark. .....
Novaculichthys taeniurus (Lacepede)

First and second and sometimes also fifth spines filamentous; body with white blotches bordered by dark lines. it is suspected that this species represents the young of N. taeniurus. .....
Novaculichthys bifer (Lay & Bennett)

Section No.

17 (9) Third anal spine longer than second. 18

Second anal spine longer than third. .....
Pseudocheilinus hexataenia (Bleeker)

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18 (17) Caudal with upper and middle ray produced. 19

Caudal rounded, upper and middle rays not produced. .....
Cheilinus rhodochrous Gunther.

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19 (18) Upper caudal ray usually longer than head; head about 3 in length; eye about 5 and snout about 3 1/4 in head. ..
Cheilinus bimaculatus Cuvier & Valenciennes.

Upper caudal rays shorter than head; head about 2.6 in length; eye about 6 and snout about 2.7 in head. It is questionable that this species is part of the Hawaiian fauna. .....
Cheilinus trilobatus Lacepede.

---

20 (7) No large incisors compressed and with cutting edge; if the anterior teeth are large, they are not compressed but pointed. 22

Two large incisors anteriorly in the jaws, directed forward with compressed cutting edge. 21

---

21 (20) Body covered with small white spots, each centered in a scale. OPULE. .....
Anampses cuvier Quoy & Gaimard.

Body not covered with small white spots, but about one dozen pale horizontal stripes present. .....
Anampses godeffroyi Gunther.

---

22 (20) Body not elongate or cylindrical, depth less than 5.5 times in length. 23

Body elongate, cylindrical; depth 5.5 to 8 times in standard length; a single row of scales on cheek. .....
Cheilio inermis (Forskal)

Section No.

23 (22) Dorsal spines nine. 34

Dorsal spines eight. 24

---

24 (23) Snout not produced, but formed as in the majority of fishes. 26

Snout produced, elongate. 25

---

25 (24) Caudal semilunate, yellow, the outer rays dark and prolonged; body dark purple brown or blue or green; dorsal and anal light yellowish. .....
Gomphosus tricolor Quoy & Gaimard.

Caudal truncate or rounded, the outer rays scarcely prolonged; vertical fins darkish, or very dark, with a white outer border; scales of body with dark spots or stripes anteriorly. .....
Gomphosus varius Lacepede.

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26 (24) A broad band or collar about body behind head reddish orange in color, remainder of body dark in color. HINAIEA LAUWILI. .....
Thalassoma duperrey (Quoy & Gaimard)

No encircling collar present. 27

---

27 (26) Head uniform in coloration without distinct bars or stripes. 33

Head with bar, spots, or stripes of color contrasting to background color. 28

---

28 (27) Canine teeth present on front of lower jaw; membrane between second and third dorsal fin spines without intense dark spot. 29

Canine teeth absent on front of lower jaw; an intense dark spot on membrane between second and third dorsal fin spines. .....
Thalassoma lutescens (Lay & Bennett)

Section No.

29 (28) A scaly patch or a few scales only on superior part of opercle. 30

No scales on head or opercle; no transverse bands on body; pectoral with a terminal black blotch; dark color of back not sharply defined from light underside. ...
Thalassoma melanochir (Bleeker)

---

30 (29) Body with more or less conspicuous dark, longitudinal bands, with or without narrow, dark transverse bands, which may connect the longitudinal bands and divide the light color of the body into a longitudinal series of more or less rectangular light blotches; generally a black spot between the anterior dorsal spines; distal part of pectoral more or less dark. 31

No dark longitudinal or transverse bands on body; scales of body generally with vertical stripes; head dark, with longitudinal bands; pectorals light, with a more or less club-shaped dark blotch; a large dark blotch at caudal in young. .....
Thalassoma lunare (Linne)

---

31 (30) Head marked with narrow stripes and spots or transverse bands, but not as below. 32

Head marked with longitudinal curved bands, bordered with narrow dark lines, the lower ones of both sides connected over chin, the upper ones over occiput; caudal truncate, the lobes slightly produced. .....
Thalassoma quinquevittatum (Ley & Bennett)

---

32 (31) Head with spots and narrow stripes; caudal truncate or slightly rounded. HINALEA. .....
Thalassoma umbrostigma (Ruppell)

Color of upper part of head light, spreading downward anteriorly on sides of snout as a triangular prolongation, sharply defined by a narrow black line; caudal slightly rounded, the lobes slightly produced. .....
Thalassoma purpureum (Forskal)

Section No.

33 (27) Light rectangular blotches on the sides surrounded by dark lines and therefore very conspicuous; caudal truncate, the lobes slightly produced; two canine teeth at tip of lower jaw. AMELA. .....
Thalassoma fuscum (Lacepede)

Head uniformly darkish color; each scale on side with a narrow bluish-black vertical stripe, there forming about 45 more or less distinct discontinuous vertical bars which may fade in preservative; four canine teeth at tip of lower jaw. .....
Thalassoma ballieui (Vaillant & Savage)

---

34 (23) Cheeks naked or with a few scales only. 35

Cheeks scaly; lower lip divided into two lobes, connected by a median frenulum, and produced into a rounded lobe; scales in lateral line small 52-53 in number. ....
Ichmoides dimidiatus (Cuvier & Valenciennes)

---

35 (34) Scales large, in lateral series from 25 to 30 in number. . 43

Scales small or minute, in lateral series from 50 to over 100 in number. 36

---

36 (35) Number of scales in lateral series from 50 to 92. 37

Number of scales in lateral series more than 100; all dorsal spines flexible; no canines at corner of mouth; about 18 vertical bands on side of body narrower than the interspaces. .....
Holocyrnogus semidiscus (Lacepede)

---

37 (36) Number of scales in lateral series 70 to 92. 41

Number of scales in lateral series 52 to 64. 38

---

38 (37) Scales in lateral series numbering less than 60 (50 to 55). 39

Scales in lateral series 60 to 64, color in life, deep green, in preservative, uniform blue black; young with broad transverse band before anal. .....
Coris avgula Lacepede.

Section No.

39 (38) First two dorsal spines not markedly close together and not separated from others by a gap greater than that between remainder of dorsal spines. 40

First two dorsal spines closer together and separated from others by a gap greater than that between remainder of dorsal spines; a small black spot on fin membrane between first and second dorsal spines; four or five cross bands on caudal fin. .....
Coris bellieui Vaillant & Sauvage.

---

40 (39) About 7 transverse dark bands on back, not reaching further downward than middle of sides; dorsal spines stiff and pungent. .....
Coris variegata (Ruppell)

A red band paralleling anterior portion of lateral line, this band pale creamy in preservative; general color brown or olive with red and bluish bands on head and body. .....
Coris venusta Vaillant & Sauvage.

---

41 (37) Scales in lengthwise series fewer than 90, no blue black spot on opercular flap. 42

Scales in lengthwise series 90 to 92; a blue black spot on opercle tip; about 8 blackish vertical cross bars on side behind pectoral fin. .....
Coris lepomis Jenkins.

---

42 (41) Body with longitudinal bands, these alternating yellow and black in young; narrow and light in shade and confined to dorsal half of side in adult. .....
Coris flavovittata (Bennett)

Body without longitudinal color bands; body red in young with four or five saddle shaped black margined white blotches across head and back --- the one above pectoral fins completely encircling body in specimens less than one inch in length; body darker, brownish in adult with many small bluish or greenish spots, these becoming more numerous posteriorly; tail clear yellow. ..
Coris gaimardi (Quoy and Gaimard)

Section No.

43 (35) Canine teeth present, scales of thorax smaller than those of sides. 45

No canine teeth present; scales of thorax equal to or larger than those of sides. 44

---

44 (43) Head and body with longitudinal blue bands, light in preservative; two along middle of side with broader red band between; one from eye along dorsal fin base; dorsal fin red. .....
Stethojulis albovittata (Bonnaterre)

A triangular creamy spot above axil of pectoral fin; one or two, sometimes three dark spots, edged with white, behind each other on posterior part of caudal peduncle. ..
Stethojulis axillaris (Quoy & Gaimard)

---

45 (43) Body not compressed; inferior pharyngeals with more than 3 teeth, without large median molar; four to two canines in the jaws. 46

Body compressed, flattened; inferior pharyngeals with only 3 teeth, the middle one a large molar; four canines in the jaws, the outer pair turned backwards; a light spot at posterior edge of each scale on sides. .....
Macropharyngodon meleagris (Cuvier & Valenciennes)

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46 (45) No canine tooth at angle of mouth; two canines anteriorly in each jaw; no dark spot on membrane between first and second dorsal spines. .....
Pseudojulis soresina Snyder.

A canine tooth at angle of mouth on each side as well as a pair anteriorly in each jaw; a black spot on fin membrane between first and second dorsal spines. .....
Halichoeres ornatissimus (Garrett)

Section No.

Family No. 83

SCARIDAE

Parrot Fish

1 (B-64) Gill membranes broadly joined to isthmus without forming a fold across it; teeth in each jaw imbricated in 3 or 4 series, more or less distinct anteriorly; lateral line subcontinuous. 16

Gill membranes forming a fold across isthmus; teeth in each jaw fully coalesced, jaws with a distinct median suture; lateral line interrupted on anterior part of caudal peduncle, beginning again a scale row further down. 2

---

2 (1) Snout without a conspicuous slaty blue or purplish blue saddle across it bordered by a blue green line. 3

A conspicuous slaty blue or purplish blue saddle across snout bordered by a blue green line; blue green lines about eyes; body and fins with many brilliant blue and green markings. UHU. .....
Scarus perspicillatus Steindachner.

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3 (2) Lower limb of preopercle (preopercle flange) scaleless. .. 9

Lower limb of preopercle, with some scales present. 4

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4 (3) No pale longitudinal lines on sides of abdomen. 5

Pale longitudinal lines on sides of abdomen; caudal fin truncate behind. .....
Scarus dubius Bennett.

---

5 (4) Dorsal fin banded longitudinally with a median or partly median band. 7

Dorsal fin without longitudinal median band. 6

Section No.

6 (5) A broad pale band from upper hind eye edge to suprascapula, sometimes on small, pale suprascapular spot or spots remain behind eye; color otherwise largely deep dusky; canines strong. .....
Scarus nuchipunctatus Valenciennes.

No pale band from eye to suprascapula; head above, trunk and tail with dusky vermiculations. .....
Scarus rubroviolaceus Bleeker.

7(5) Yellowish, brownish or pinkish bands from snout towards eye; teeth usually blue or green sometimes white. 8

A bluish or greenish band from snout to under eye; no yellowish or buff band present; caudal fin lunate in adult, outer portion of middle rays blue or greenish blue in color. LAUIA. .....
Scarus formosus (Cuvier and Valenciennes)

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8 (7) A single pinkish or yellowish line from upper lip towards eye but not reaching beyond eye; outer caudal rays longer than head in adult. .....
Scarus jordani (Jenkins)

More than a single line on snout; outer caudal rays not longer than head. .....
Scarus janthochir (Bleeker)

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9 (3) No conspicuous black spot on dorsal fin membrane between first and second spines. 10

A conspicuous black spot on dorsal fin membrane between first and second spines. .....
Scarus hornbosteli (Fowler)

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10 (9) Head with yellow or green lines or bands or spots of bright color. 15

Head plain, not marked with yellow or green bands or spots. 11

Section No.

11 (10) Sides of abdomen not marked with 3 pale or white longitudinal lines. 12

Sides of abdomen marked with 3 pale or white longitudinal lines. .....
Scarus dubius Bennett.

---

12 (11) Lips cover most of teeth. 14

Lips cover 1/2 or less of the dental plate. 13

---

13 (12) Least depth of caudal peduncle about 1/2 length of head..
Scarus ahula Jenkins.

Least depth of caudal peduncle a little less than 1/2 length of head (goes 2 1/2 to 2 3/5 times in head). .....
Scarus erythrodon (Cuvier and Valenciennes)

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14 (12) Upper lip nearly on longitudinal body axis, about 1/2 eye diameter below a longitudinal line through lower border of eye. .....
Scarus brunneus (Jenkins)

Upper lip below longitudinal body axis, about full diameter of eye below a longitudinal line through lower border of eye. .....
Scarus bowhorus (Jordan & Evermann)

---

15 (10) Dorsal and anal fins usually with yellow or green longitudinal band medially; yellow or green line from rictus to lower eye edge, sometimes a short one above and before or one above and behind eye; canines weak, obsolete, or absent. .....
Scarus sordidus (Forskal)

Dorsal and anal fins without median longitudinal band, though sometimes a brown one on dorsal fin; yellow or green band from rictus to lower eye edge and often two short ones back from hind eye edge; canines strong, well developed. .....
Scarus forsteri Valenciennes.

Section No.

16 (1) Dorsal fin spines flexible. 19

Dorsal fin spines stiff and pungent. 17

---

17 (16) Insertion of ventral fins not far back, distance between it and insertion of anal fin greater than length of head. 18

Insertion of ventral fins far back, distance between it and insertion of anal fin less than length of head; eight external flaring canine teeth on upper jaw. .....
Scaridea octodon Fowler.

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18 (17) Distance between insertion of ventral fins and insertion of anal fin greater than length of spinous portion of dorsal fin base; head goes about 3.25 times in length of body without caudal. .....
Scaridea zonarcha Jenkins.

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19 (16) No narrow white lines radiating from eye; general color of body not blue. 20

8 narrow white lines radiating from eye; general color of body blue. .....
Leptoscarus vaigiensis (Quoy & Gaimard)

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20 (19) Side of body above lateral line with a series of about 5 roundish white spots as large as pupil; side below lateral line with about 10 or 12 large round spots; numerous smaller spots and irregular markings scattered among those; snout about 2.8 times in head length. ....
Leptoscarus carolinus (Cuvier)

Side of body without the pattern of spots as described above; snout goes about 2.5 or less in head length. ...
Leptoscarus viridescens (Ruppell)

Section No.

Family No. 84

AMMODYTIDAE

Sand Launce

1 (D-25) A single species of this family occurs in Hawaiian waters.
Bleekeria gillii T. B. Bean.

Family No. 84A

SCORPIDAE

1 (B-51) A single species of this family occurs in Hawaiian waters
Microcanthus strigatus (Cuvier & Valenciennes)

Family No. 85

CHAMPSODONTIDAE

1 (B-10) A single species in Hawaiian waters. .....
Champsodon fimbriatus Gilbert.

Section No.

Family No. 86

CHAETODONTIDAE

Butterfly or Angel Fish

1 (B-47) A very strong spine at angle of preopercle; dorsal spines graduated in size, the last one longest. 20

Preopercle without a strong spine at angle. 2

---

2 (1) Distance from tip of upper jaw to a vertical through foreborder of eye less than distance from the vertical through foreborder of eye to the posterior edge of opercle. 3

Distance from tip of upper jaw to a vertical through foreborder of eye substantially greater than distance from the vertical through foreborder of eye to the posterior edge of opercle. LAUWILIWILI NUKUNUKU (HGM. .. Forcipiger longirostris (Broussonet)

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3 (2) Fourth spine of the dorsal fin produced, much longer than the third or any other dorsal spine. 26

Fourth spine of dorsal fin not markedly produced or longer than third. 4

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4 (3) Lateral line terminates before or near end of soft dorsal fin; between 35 to 50 scales in lateral series from operculum to caudal fin base. 5

Lateral line reaches caudal fin base; scales small, about 60 in lateral series from operculum to caudal fin base; color pattern of body without black bands, but with a large white, rhomboidal area on side surrounded anteriorly and posteriorly by orange yellow, which is often dusky in color over nose and face. DIRTY FACE. ..... Hemitaurichthys zoster (Bennett)

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5 (4) Color pattern with a vertical bar passing through eye. .. 6

Section No.

5 (4) Color pattern without a vertical bar passing through eye; about 8 slightly oblique narrow blue bars on body; a dark patch immediately before dorsal fin insertion; another blue margined dark patch on vertical portion of soft dorsal fin and caudal peduncle. .....
Chaetodon frenblii Bennett.

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6 (5) Ventral fins not blackish; color pattern on body may or may not include a regular pattern of bars or stripes. 7

Ventral fins blackish; body coloration without a regular pattern or design of bars and or stripe, but with dusky spots, especially posteriorly, caudal tip broadly bordered with dusky. .....
Chaetodon corallicola Snyder.

---

7 (6) Vertical ocular bar, measured above eye, wider than eye. 13

Vertical ocular bar, as measured above eye, narrower than, or no wider than eye. 8

---

8 (7) Vertical ocular bar black or dark in color. 10

Vertical ocular bar orange or golden, dark margined; dorsal or posterior dorsal part of body largely blackish. 9

---

9 (8) The dark area on the dorsal part of body partially enclosing one whitish blotch posteriorly and completely enclosing one anteriorly; dark area extends over caudal peduncle but does not cover any part of the anal fin; second dorsal spine over two thirds the height of third dorsal spine. .....
Chaetodon quadrimaculatus Gray.

The dark area on the posterior dorsal part of the body extends from the base of the third dorsal spine diagonally across to the vertical portion of the anal fin which is partially covered by it; second dorsal spine one half or less than the height of the third. .....
Chaetodon (tinkeri?)

Section
Section No.

10 (9) Vertical ocular bar without other dark vertical bars immediately before and behind it. 12

Vertical ocular bar with other dark vertical bars immediately before and behind it. 11

---

11 (10) Color pattern of body with about 17 horizontal or oblique bands, descending anteriorly; a narrow, dark band along the middle of dorsal and anal fins, and another at edge of anal; scales in lateral line 50 or more; dorsal rays 25 or more. .....
KIKAKAPU Chaetodon ornatissimus Solander.

Color pattern of body with about 17 horizontal or slightly oblique dark bars, the ones dorsally and ventrally curved in harmony with outline of body; a dark elongate, almost vertical patch outlined in yellow on base of soft dorsal, extending slightly on basal part of caudal peduncle; a dark band across basal part of caudal fin rays; an elongate dark patch outlined in yellow on base of anal fin rays; yellowish blotches on outer portion of dorsal and anal fin rays; scales in lateral line less than 40; dorsal rays 23 or less. .....
Chaetodon trifasciatus Mungo Park.

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12 (10) A dark bar across basal part of caudal peduncle. ... 13

Caudal peduncle without dark bar across basal part.. 13

---

13 (12) Dorsal rays 23 or more; anal rays 21 or more; body color pattern composed either of narrow oblique lines or a large posterior dorsal blotch; some dorsal rays may be produced into a filiform thread at least in adult. 14

Dorsal rays 21 or less; anal rays 17 or less; a bluish spot on trunk scales; outer half of anal fin spines and ventral anal rays black with an inner paler or yellowish band. .....
Chaetodon citrinellus Cuvier & Valenciennes

Section No.

14 (13) There are 34 or more scales in the lateral line count; a large dark blotch covers upper posterior quarter of body, extending on to posterior part of spinous dorsal fin and basal part of soft dorsal; the fourth or fifth dorsal ray filiform, produced in adult into a posteriorly projecting filiment; two vertical paralleling dark lines on outer part of soft dorsal and anal fins, not crossing caudal peduncle. .....
Chaetodon ephippium Cuvier & Valenciennes.

There are about 30 scales in the lateral line count; body color pattern consisting of a number of oblique lines running together at an angle; fifth or sixth dorsal ray, in adult, produced into a filiform thread; soft dorsal fin narrowly dark edged; a black spot often on soft dorsal; no large dark blotch covering upper posterior quarter of body. .....
Chaetodon auriga Forskal.

---

15 (11) Body color pattern consisting of vertically arranged spots or bars, dark in color. 17

Body color pattern consisting of a large dark spot on middle of dorsal part of side or on middle of soft dorsal fin. 16

---

16 (15) A dark ocellus on middle of soft dorsal fin; dark ocular bar followed by a light band; soft dorsal and anal fins with a narrow dark band inside tips of rays; dark band at base of caudal peduncle followed by a light one and this in turn followed by a narrow dark one just at caudal base; size small, less than two inches; forty scales or less in lateral line, young of.
Chaetodon lunula (Lacepede)

A large dark spot on middle of upper part of side; this tending to be wedge shaped in young, dark ocular bar not followed by a light band; lips may be reddish in color; a few small dark spots on scale centers just below dark spot on side in smaller examples; forty five scales in lateral line; size large or small. KIKAKAPU.
Chaetodon unimaculatus Bloch.

Section No.

17 (15) Color pattern on body consisting of vertically arranged dark spots in about 8 to 12 rows; a broad dark bar across caudal peduncle; caudal fin without dark crescent across middle. .....
Chaetodon miliaris Quoy & Gaimard.

Color pattern of body consisting of about 5 vertical bands; small spots at portion of each scale between bands; a narrow band across caudal peduncle at base of caudal and a darker or black bar vertically across middle of caudal fin. .....
Chaetodon punctatofasciatus Cuvier & Valenciennes.

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18 (7) Profile of body from insertion of dorsal fin to upper lip concave; snout not black; tips of last rays of anal not fiery red. 19

Profile of body from insertion of dorsal fin to upper lip not especially concave; ocular band very broad, extending from the nape to the ventral fins, edged on both sides with yellow; snout black; body dusky, dove colored above, each scale with a yellowish spot; anal band across caudal peduncle black; tips of last rays of anal fiery red in life; two black lines across caudal. ..
Chaetodon reticulatus Cuvier & Valenciennes.

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19 (18) A broad black area at base of soft dorsal, sending oblique streaks downward and forward across the body; no black area on shoulder. .....
Chaetodon lineolatus (Cuvier & Valenciennes)

A broad dark band descending obliquely forward from middle of dorsal fin base across shoulder to upper edge of opercle, becoming wider as it descends; no broad black area at base of soft dorsal; a vertical white band immediately posterior to the dark ocular band. .....
Chaetodon lunula (Lacepede)

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20 (1) Scales small, 45 to 50 in lateral series; suborbital without well developed spines. 21

Scales large, about 28 in lateral series; suborbital with well developed spines; color of body bright reddish orange with the posterior two thirds suffused with dusky; a brownish black spot above pectoral fin; anal with a broad blackish margin, narrowly edged with blue; middle of caudal lemon yellow, pectorals orange. .....
Centropyge fisheri (Snyder)

Section No.

21 (20) Color pattern of body without broad dark horizontal band running from eye to and extending on posterior portion of soft dorsal fin; dorsal fin spines 14 or more in number. 22

Color pattern of body with a broad dark horizontal band running from eye to and extending on posterior portion of soft dorsal fin; a broad black band across caudal fin tip; anal with a black band; dorsal fin spines 13 in number. .
Holacanthus arcuatus Gray.

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22 (21) Body color pattern not abruptly yellow anteriorly and blackish or bluish posteriorly. 23

Body color pattern abruptly yellow anteriorly and blackish or bluish posteriorly; caudal fin uniformly yellow; soft dorsal and anal fins, in adult, at least, with middle rays produced; those of dorsal fin somewhat filamentous, nearly or quite reaching tip of caudal fin; preopercular spines nearly or quite reaching posterior base of pectoral fin..
Centropyge bicolor (Bloch)

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23 (22) Eye without a deep blue ring; color pattern on body of many oblique vertical bars and or a reticulated pattern of dark lines over scarlet on head and anterior portion of body. 24

A deep blue ring about orange eye; body color, without numerous bars, deep yellow; fins are likewise yellow with a narrow bright blue edge on dorsal, anal, and caudal; a deep blue bar on opercle with an orange edge behind. ....
Centropyge flavissimus Cuvier & Valenciennes.

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24 (23) Color pattern not composed of about 22 narrow, yellow, oblique to horizontal, bands on body or a circular pattern of narrow blue lines. 25

Color pattern in adult oblique to horizontal narrow yellow bands on body about 22 in number on a background of dark bluish; in young narrow circular blue bands on a black background. .....
Pomacanthodes imperator (Bloch)

Section No.

25 (24) Dorsal portion of head and body dark, the dark coloration extending over sides in vertical oblique bars, paralleling scale rows; ventral portion of body red, this color extending upwards on sides between above mentioned dark bars; dorsal, anal and caudal fins dark; soft dorsal and anal fins blue edged. .....
Centrowyge bispinosus (Gunther)

Head and anterior dorsal portion of body scarlet, covered by a reticulated pattern of dark lines; posterior portion of body a purplish black color. ..... This species may be a color variety of C. bispinosus (Gunther). .....
Centrowyge potteri (Jordan & Metz)

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26 (3) The anterior or first broad dark vertical or oblique band that completely crosses body extends over ventral fins. .. 27

The second broad dark vertical or oblique band that completely crosses body extends over the ventral fins. .....
Heniochus monoceros (Cuvier)

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27 (26) There are two dark bands completely crossing body. .....
Heniochus acuminatus (Linne)

There are three dark bands completely crossing body. .....
Heniochus permutatus Cuvier

Section No.

Family No. 87

ZANCLIDAE

Moorish Idols

1 (B-39, B-47) Preorbital with a strong backward directed spine above corner of mouth; no horn on forehead above each eye in adult. .....
Zanclus canescens (Linne)

Preorbital without a strong backward directed spine; a horn on forehead above each eye in adult. KIHIKIHI. .
Zanclus cornutus (Linne)

Section No.

Family No. 88

ACANTHURIDAE

Surgeon Fish

1 (B-44) Ventral fin with an initial spine and three rays; two fixed spines or bony tubercles on each side of caudal peduncle in all but the young. 17

Ventral fin with an initial spine and five rays; a spine folding forward into a groove on each side of caudal peduncle in all but young. 2

---

2 (1) Teeth mostly fixed, never all moveable, 30 or less in number. 3

Teeth elongate, setiform, freely moveable, the tips of some expanded, 36 to 46 in number; often a yellow ring about eye. KALE. .....
Ctenochaetus strigosus (Bennett)

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3 (2) Dorsal fin with nine, rarely eight or ten, spines. 5

Dorsal fin with four or five spines. 4

---

4 (3) Dorsal fin usually with four spines; body with five light yellowish vertical bands with broader darker interspaces; a narrow light line sometimes in each interspace, a dark vertical band through eye. SAILFIN TANG. .....
Zebrasoma veliferum (Bloch)

Dorsal fin usually with five spines; body without bands or other contrasting markings, its color in life a clear yellow or orange yellow. LAUIPALA. .....
Zebrasoma flavescens (Bennett)

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5 (3) Body not crossed by five or six narrow dark vertical bands. 6

Body crossed by five or six narrow dark vertical bands; background color light gray; from 21 to 24 rays in soft dorsal fin, and from 19 to 21 rays in anal fin. MANINI. CONVICT TANG. .....
Acanthurus sandvicensis (Streets)

Section No.

6 (5) Posterior half of body not spotted with white. 7

Posterior half of body and dorsal and anal fins with numerous pale spots on a darker background; a pale vertical band from occiput to opercle; a second pale vertical band from under spinous dorsal fin to belly; third (sometimes faint) from front of soft dorsal to front of soft anal; body deep, greatest depth going from 1.3 to 1.6 times in length. MAIKO. .....
Acanthurus guttatus Bloch

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7 (6) Caudal fin not marked by blue or dark spots. 8

Caudal fin marked by blue or dark spots; a pale horizontal band through eye; body with many fine, somewhat obscure, slaty lines; soft dorsal fin with 25 to 27 rays; anal with 23 to 26 rays. PUALU. .....
Acanthurus bariene (Lesson)

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8 (7) No pale spot immediately below eye. 9

A pale spot immediately below eye; dorsal and anal fins with a light basal band, becoming wider posteriorly; a light U shaped band on chin; body color dark, caudal peduncle abruptly paler. .....
Acanthurus aliala Lesson

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9 (8) Less than 28 rays in soft dorsal fin; less than 26 rays in anal fin; no red patch (light in preservative) on posterior side of body; 10

30 or more rays in soft dorsal fin; 27 or more rays in anal fin; a red patch (Light in preservative) on posterior side of body including caudal peduncle spine (in adults); general body color very dark or black. PAKUIKUI. .....
Acanthurus achilles Shaw

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10 (9) No yellow or orange patch, fading in preservative, either on shoulder or upper part of gill opening. 12

A yellow or orange or red patch, fading in preservative to whitish, usually elongate, either on shoulder or upper part of gill opening. 11

Section No.

11 (10) An orange or red (in young blackish) black edged shoulder bar, extending from upper part of gill opening posteriorly to above and sometimes beyond pectoral tip, about equal to diameter of eye, fading in preservative to a whitish bar edged in brown; middle caudal rays with white crescent near end; dorsal fin with 22 to 24 rays; greatest body depth goes two or more than two times in length. NAENAE. .....
Acanthurus olivaceus Bloch

A patch of orange on upper part of gill opening, with a black streak from opercle to above middle of pectoral fin; another black band from caudal spine to above middle of anal fin; caudal with broad white transverse band; dorsal fin usually with 27 rays. .....
Acanthurus nigricans (Linne)

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12 (10) Caudal peduncle not crossed by light vertical band. 14

Caudal peduncle crossed by light vertical band. 13

---

13 (12) Tips of pectoral fins pointed; a black spot at base of last dorsal and anal fin rays; a light vertical band from beneath anterior portion of dorsal fin, extending downward just back of eye and across operculum, not crossing breast. .....
Acanthurus leucopareius (Jenkins)

Tips of pectoral fins rounded; no black spots at base of last dorsal and anal fin rays; body uniformly dusky without a white vertical band behind eye. .....
Acanthurus umbra (Jenkins)

---

14 (12) Head and forepart of body without thickset golden yellow spots. 15

Head and forepart of body strewn with golden yellow spots in life; a dark spot at base of last dorsal and anal rays..
Acanthurus lucillae (Fowler)

15(14) While an axil blotch may be present, it is not as described below, visible below edge of the pectoral fin. 16

A black spot at lower pectoral base only partially covered by fin, not extending on pectoral base proper; body without other definite markings. .....
Acanthurus thompsoni (Fowler)

Section No.

16 (15) From 15 to 16 teeth present in jaws; body without distinctive markings; dorsal and anal fins with four or five horizontal bands, more or less evident; no dark spots at base of last dorsal and anal rays. .....
Acanthurus fuliginosus (Lesson)

From 10 to 12 teeth in one jaw, 14 in the other; body sometimes with narrow bands; dorsal and anal fins plain, sometimes a dark spot on basal portion of last rays of each. MAIKO. .....
Acanthurus elongatus (Lacepede)

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17 (1) Area surrounding caudal spines not differing in color from remainder of caudal peduncle. 19

Area surrounding caudal spines differing in color from remainder of caudal peduncle. 18

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18 (17) Area surrounding caudal spines orange in color; a horn never on snout. UMAUMAIEI. .....
Naso lituratus (Bloch)

Area surrounding caudal spines light bluish in color; a horn on snout in adult, its axis horizontal through upper part of eye; distance from upper lip, measured from upper side, to point of attachment of horn, ventral, much greater than eye diameter. KALA. .....
Naso unicornis (Forskal)

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19 (17) A horn on forehead in adult; snout goes from 1.4 to 1.65 times in head. 20

A horn is never developed on forehead; snout slightly shorter, going from 1.75 to 1.8 times in head; soft dorsal sometimes in smaller sizes with 4 longitudinal blackish bands. .....
Naso hexacanthus (Bleeker)

---

20 (19) Often numerous spots and short irregular bars of darker color on body; distance from upper margin of upper lip to underside of horn less than eye diameter; six dorsal fin spines. KALAHOLO. .....
Naso brevirostris (Valenciennes)

Section No.

20 (19) Body not spotted; distance from upper margin of upper lip to underside of horn about the same as eye diameter or a little more; usually five spines in dorsal fin. ... *Naso annulatus* (Quoy & Gaimard)

Section No.

Family No. 89

GEMPYLIDAE

Snake Mackerel

1 (B-22, B-24, C-25, D-21) One two rayed finlet behind dorsal and anal fins. 2

5 to 7 finlets behind dorsal and anal fins. 3

2(1) Dorsal fin spines number 13 to 15; ventral fins well developed with one spine and 5 rays; greatest depth of body goes about 5.5 times in length. .....
Ruvettus pretiosus Cocco.

Dorsal fin spines number 19 to 20; ventral fins reduced to a single spine; greatest depth of body goes nearly 3 times in length. .....
Promethichthys prometheus (Cuvier & Valenciennes)

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3 (1) First dorsal fin spines about 30 in number; greatest depth of body will go about 17 times in standard length. HAULIULI. .....
Gempylus serpens Cuvier & Valenciennes

First dorsal fin spines about 9 in number; greatest depth of body will go less than 5 times in standard length. DEEP SEA ESCOLAR. .....
Lepidocybium flavo-brunneum (Smith)

Section No.

Family No. 90

TRICHIURIDAE

Cutlass Fish

1 (C-25, D-22) A single species reported from Hawaiian waters. ..... *Lepidopus tenuis* Gunther.

Family No. 91

SCOMBRIDAE

Mackerels

1 (B-23) A single species of this family reported from Hawaiian waters. ..... *Scomber japonicus* Houttuyn.

Section No.

Family No. 92

THUNNIDAE

Tunas

1 (B-24) First dorsal fin with 10 to 16 spines; greatest depth of body goes 5 or less times in length. 2

First dorsal fin with about 25 spines; body long and slender, greatest depth about 6.5 times in length. ONO[5]. .....
Acanthocybium solandri (Cuvier & Valenciennes)

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2 (1) Body completely scaled, scales may be enlarged in corselet and on lateral line. 5

Body naked, without scales, except for the scaly corselet and lateral line. 3

---

3 (2) The last spine in the first (spinous) and first ray in the second (soft rayed) dorsal fins close together, separated by a distance equal to about 1/5 of head length. 4

The first and second dorsal fin far apart, separated by a distance equal to about 1/2 the head length or more. .....
Auxis thazard (Lacepede)

---

4 (3) 4 dark longitudinal stripes present on lower surface of side below lateral line and on belly. AKU. .....
Katsuwonus pelamis (Linne)

No dark longitudinal stripes below lateral line, about 12 dark wavy streaks on back. KAWAKAWA. .....
Euthynnus yaito (Kishinouye)

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5 (2) Dorsal finlets with some yellow, usually largely yellow. 7

Dorsal finlets without any yellow markings. 6

---

5. The Ono is considered by some authorities as being sufficiently distinct from other tuna-like fishes to justify its placement in a separate family, the Acanthocybiidae.

Section No.

6 (5) Spines in first dorsal fin 14 or less in number. BLUE FIN TUNA. ..... *Thunnus thynnus* (Linne)

Spines in first dorsal fin 18 in number. BONITO. ..... *Sarda orientalis* (Cuvier & Valenciennes)

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7 (5) Gill rakers on upper and lower branch of first gill arch less than 32 in number, usually less than 30. 8

Gill rakers on upper and lower branch of first gill arch 36 to 39 in number; pectoral fin does not reach to a vertical through second dorsal fin insertion; anal finlets silvery. JAPANESE BLUEFIN TUNA, BLACK TUNA. MAGURO. ..... *Thunnus orientalis* (Temminck & Schlegel)

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8 (7) Gill rakers on upper and lower branch of first gill arch 24 or more in number; air bladder present; pectoral fin reaches, in most of the species included here, to or beyond a vertical through the last spine of the first dorsal fin. 9

Gill rakers on upper and lower branch of first gill arch 23 or less in number; no air bladder present; pectoral fin does not reach to a vertical through end of first dorsal fin; size small, usually less than 25 pounds. ..... *Kishinoella rara* (Kishinouye)

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9 (8) Anal finlets with yellow or orange color; a vertical through tip of pectoral fin usually falls anterior to end of anal fin base. 10

Anal finlets dusky without yellow or orange color; a vertical through tip of pectoral fin usually falls posterior to end of anal fin base; size medium to small, rarely more than 70 or 80 pounds, usually much less. ALBACORE. ..... *Germo alalunga* (Gmelin)

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10 (9) Dorsal and anal finlets a clear yellow very narrowly black edged; some large individuals of this species may have elongate second dorsal and anal fins, reaching nearly to the caudal fin and beyond; number of gill rakers on upper and lower limb of first gill arch usually 30, range of variation from 27 to 31; liver without marginal striations. YELLOWFIN TUNA. AHI. ..... *Neothunnus macropterus* (Temminck & Schlegel)

Section No.

10 (9) Dorsal and anal finlets with a broad black border, anal finlets often with an orange rather than yellow color; second dorsal and anal fins never greatly elongated, a little longer than the longest spines of the first dorsal fin and much less than pectoral fin; number of gill rakers on upper and lower limb of first gill arch usually 27, range of variation from 24 to 29; liver with marginal striations. BIG EYE TUNA. .....
Parathunnus sibi (Temminck & Schlegel)

Section No.

Family No. 93

ISTIOPHORIDAE

Spearfish, Sailfish, & Marlins

1 (C-18) Head length, measured from nare to posterior margin of opercles, less than length of pectoral fin or sword as measured from nare to tip. 2

Head length, measured from nare to posterior margin of opercles, about the same or usually more than length of pectoral fin or sword, as measured from nare to tip. SHORT NOSED SPEARFISH. .....
Tetrapturus illingworthi Jordan & Evermann.

2 (1) Anterior rays of dorsal fin longer than middle rays, which are much less in length than greatest depth of body. 3

Anterior rays of dorsal not as long as middle rays, which are much longer than greatest body depth. A'U LEPE, SAILFISH. .....
Istiophorus orientalis (Schlegel)

3 (2) Pectoral fin capable of being folded back along the side; a flexible joint existing at its juncture with the body. 4

Pectoral fin extends rigidly out, almost at right angles to longitudinal axis of body, not capable of being folded back along side and without a flexible joint existing at its juncture with the body. WHITE MARLIN, SILVER MARLIN. ....
Makaira marlina Jordan & Hill

4 (3) Head length, measured from nare to posterior opercle edge, less than 85 percent (73 to 83 percent) of length of longest anterior dorsal ray, which is longer than greatest depth of body; greatest depth of body less than 70 percent of sword length, usually 50 to 65 percent. 5

Head length, measured from nare to posterior opercle edge, more than 85 percent (87 to 118 percent) of length of longest anterior dorsal ray which is equal to or less than greatest depth of body; greatest depth of body more than 70 percent of sword length, usually 75 to 85 percent. A'U. BLACK MARLIN. .....
Makaira mazara (Jordan & Snyder)

Section No.

5 (4) Initial dorsal fin rays much longer than middle rays, 20th dorsal ray less than 40 percent (19 to 33 percent) of length of longest dorsal ray. A'U KI. STRIPED MARLIN. .....
Makaira mitsukurii (Jordan & Snyder)

Initial dorsal fin rays twice as long or less than middle rays, 20th dorsal ray 50 percent or more (52 to 58 percent) of length of longest dorsal ray. STRIPED MARLIN. .....
Makaira ectenes (Jordan & Evermann)

Family No. 94

XIPHIIDAE

Broadbill Swordfish

1 (D-23) The single cosmopolitan species of this family occasionally taken in Hawaiian waters. A'U KU. BROADBILL SWORDFISH. .....
Xiphias gladius Linne.

Section No.

Family No. 95

ELEOTRIDAE

Sleepers

1 (B-1$) Scales on body coarse, not more than about 25 in lateral series; head not depressed; salt water species. 2

Scales on body fine, more than 60 in lateral series; head depressed; lower jaw protruding; found chiefly in fresh and brackish water. .....
Electris fusca (Schneider)

2 (1) No red brown crescent centered on each scale; 11 spines and rays in second dorsal fin, 10 in anal fin... 3

Each scale on side of body with a red brown crescent; 10 spines and rays in second dorsal fin, 9 in anal fin. .....
Eviota epiphanes Jenkins

3 (2) Body has 6 to 9 dark transverse bands. .....
Gobimorphus eurensis (Jordan & Evermann)

Body without transverse bands, more or less uniformly colored. .....
Asterropteryx semipunctatus Ruppell

Section No.

Family No. 96

GOBIIDAE

Gobies

1 (B-15) First dorsal fin with 6 spines. 2

First dorsal fin with 7 spines; 7 "V" shaped markings on upper side of body which is long and slender, depth going about 6.7 to 7 times in the length. .....
Vitraria clarescens Jordan & Evermann

2 (1) Scales are present on anterior as well as posterior part of body. 5

No scales are present on anterior part of body; the posterior portion (caudal peduncle) may or may not have scales. 3

3 (2) Anal fin base about as long as that of second dorsal fin; 10 or 11 spines and rays in second dorsal fin, 10 spines and rays in anal fin; fresh-water fishes. 4

Anal fin base shorter than that of second dorsal fin; 11 to 13 spines and rays in second dorsal fin; 7 to 9 spines in anal fin; a salt water and tidepool species....
Kelloggella oligolepis (Jenkins)

4 (3) No scales present; 10 spines and rays in second dorsal fin. .....
Lentipes concolor (Gill)

Scales present on caudal peduncle; 11 spines and rays in second dorsal fin. .....
Lentipes semimaculatus Gunther

5 (2) The combined count of spines and rays in the second dorsal fin is 10, (the final ray may be split from the base and is counted as one, not two), ... 13

The combined count of spines and rays in the second dorsal fin is 11, or more, ... 6

6 (5) The combined count of spines and rays in the second dorsal fin is 11, ... 10

The combined count of spines and rays in the second dorsal fin is more than 11. 7

Section No.

7 (6) The number of spines and rays present in the second dorsal fin (13-15) is less than the number in the anal fin (14-18). 9

The number of spines and rays present in the second dorsal fin (12) is equal to or one greater than the number present in the anal fin. 8

8 (7) Eye diameter small, going about 5.6 to 6.8 times in head length; dermal flaps present on shoulder girdle; body crossed by 7 to 12 bands of dark brown or black; cheeks without scales. .....
Stenogobius genivittatus (Cuvier & Valenciennes)

Eye diameter moderate, going about 3.2 to 4 times in head length; no dermal flaps present on shoulder girdle; no definite cross bands, but a series of 6 or 8 blackish brown blotches on mid-lateral area; and many small dark spots; cheeks with scales; a narrow dark bar below eye. .....
Gnatholepis anjerensis (Bleeker)

9 (7) 15 spines and rays in second dorsal fin; 18 in anal fin; eye small, going about 6 times in head length. ...
Sicyopterus albotaeniatum Gunther

13 spines and rays in second dorsal fin; 14 in anal fin; eye moderate, going about 4 to 4.4 times in head length. .....
Oxyurichthys papuensis (Cuvier & Valenciennes)

10 (6) Body slender, greatest depth going between 4 to 7 times in standard length; scales small, more than 50 in lateral series; eyes small, going between 4.2 and 8 times in head length. 11

Body robust, greatest depth going about 3.5 times in standard length; scales large, about 25 in lateral series; eyes moderate, going about 3.2 times in head length. ...
Gobiopterus farcimen Jordan & Evermann

11 (10) There are 11 spines and rays in anal fin; snout is long, going between 2.2 to 3 times in length of head; fresh water species. 12

There are 10 spines and rays in anal fin; snout is short, going about 4.8 times in length of head; a salt water species. .....
Paroxyurichthys edmondsoni Mainland

Section No.

12 (11) Head long, going between 3 and 3.5 in standard body length; mouth terminal with very thick fleshy lips, greatest thickness of upper lip greater than eye; shoulder girdle with two fleshy flaps. .....
Awaous guamensis (Cuvier & Valenciennes)

Head short, its length going between 4.2 to 4.6 in standard body length; snout overhangs mouth; no fleshy flaps on shoulder girdle. .....
Scicydium stimpsoni Gill

13 (5) The upper pectoral fin rays are fine and silky and separated; the combined count of spines and rays in the anal fin is 9; 38 or more scales present in lateral series on body; interorbital space wide, going between 1.2 and 2.4 times in eye diameter. 14

The combined count of spines and rays in the anal fin is 10; 26 scales present in lateral series on body; interorbital space is very narrow, eyes close together, going about 5 times in eye diameter. .....
Opua nephodes Jordan

14 (13) Head width is about 3/4 of head length; no scales present on cheeks. .....
Bathygobius fuscus (Ruppell)

Head width about equal to head length; scales present on the cheeks. .....
Chlamydes cotticeps (Steindachner)

Section No.

Family No. 97

BLENNIIDAE *

1 (C-21 C-24) Body covered with scales; dorsal fin divided into three distinct portions, the anterior two composed of spines, the posterior one of rays. .....
Enneapterygius heminelas (Kner & Steindachner)

Body not covered with scales, naked; dorsal fin not divided into three distinct portions 2

2 (1) Dorsal and anal fins not both united to the upper and lower portions of the caudal fin, ... 4

Dorsal and anal fins both united to the upper and lower portions of the caudal fin, ... 3

3 (2) Color nearly uniformly black; longest ventral fin ray longer than longest dorsal fin spine or ray and usually longer than longest pectoral fin ray. .....
Enchelyurus ater (Gunther)

Color not uniformly dark; two dark longitudinal bands on trunk; oblique lines on dorsal fin; ventral fin rays not as long as either those of pectoral or dorsal fins. .....
Enchelyurus edmondsoni Fowler

4 (2) The total count of spines and rays in the dorsal fin is less than 38, in the anal fin it is less than 27. 6

The total count of spines and rays in the dorsal fin is 38 or more, in the anal fin 27 or more; very large curved canines on each side of lower jaw; no tentacle over eye. 5

5 (4) Single lateral band on each side which widens out broadly to include most of caudal fin leaving only the upper and lower edges of the latter narrowly whitish. .....
Petroscirtes filamentosus (Cuvier & Valenciennes)

Two lateral bands on each side neither of which extends beyond basal part of caudal fin, becoming narrower and slightly bent posteriorly. .....
Petroscirtes ewaensis Brock

* THIS family key prepared by Donald Strasburg

Section No.

6 (4) Four greatly bent or arched symphysial canine teeth in each jaw; dorsal fin with 25 or 26 spines and rays, anal with 14 rays. .....
Ophioblennius vanderbilti Fowler

No symphysial canine teeth present in either jaw. 7

7 (6) Occipital tentacles, if present, number 4 or less; they may be simple or branched. 9

A fringe of from 20 to 60 simple occipital tentacles present. 8

8 (7) Lower jaw with a pair of lateral canine teeth; dorsal fin with 25 to 27 spines and rays; anal fin with 17 or 18. Body coloration usually uniformly dark but there may be a series of vertical dark bars or blotches; upper portion of dorsal and caudal fins pinkish or whitish. .....
Cirripectes variolosus (Cuvier & Valenciennes)

No lateral canine teeth present; dorsal fin with 24 to 25 spines and rays, anal fin with 14 to 17. Body coloration of small dark spots grouped to form larger spots on pale background. .....
Cirripectes leopardus (Day)

9 (7) Dorsal fin slightly notched (height of membrane at notch greater than one half that of adjoining fin spines or rays.) Dorsal fin with 29 spines and rays, anal with 21. No canine teeth present. .....
Blennius sordidus Bennett

Dorsal fin deeply notched (height of membrane at notch less than one half that of adjoining fin spines or rays). 10

10 (9) No lateral canine teeth present in the lower jaw. 12

Lateral canine teeth present in the lower jaw, the mouth must be well opened to see these and they are sometimes partially hidden by flesh. 11

11 (10) Supra-ocular tentacles slender and simple; dorsal fin with 30 to 33 spines and rays, anal with 21. .....
Salarias gibbifrons Quoy and Gaimard

Supra-ocular tentacles branched and presenting a bushy appearance; dorsal fin with 28 spines and rays, anal with 18 or 19. .....
Salarias marmoratus (Bennett)

12 (10) Occipital tentacles not present. 14

Section No.

Occipital tentacles present. 13

13 (12) Last rays of dorsal fin connected by membrane to uppermost rays of caudal fin (not always so in young); upper lip smooth; supra-ocular tentacle simple. .....
Salarias edentulus (Schneider)

Last rays of dorsal fin not connected to upper rays of caudal fin; upper lip crenulate; supra-ocular tentacle branched. .....
Salarias meleagris (Cuvier & Valenciennes)

14 (12) Supra-ocular tentacle simple and smooth, large adults sometimes have small branches near the tip; lips smooth. ..
Salarias zebra Vaillant and Sauvage

Supra-ocular tentacle wide, broad based, edges fringed; lips slightly crenulate. .....
Salarias lineatus Cuvier & Valenciennes

Section No.

Family No. 98

CONGROGADIDAE

Blenny Eel

1 (D-26) A single species occurs in Hawaiian waters.. .....
Congrogadus marginatus Valliant & Sauvage.

Family No. 99

LYCODAPODIDAE

1 (D-26) A single deep water representative of this family from Hawaiian waters. .....
Snyderidia canina Gilbert.

Family No. 100

BROTULIDAE

Brotulids

1 (C-27) A single species in Hawaiian waters. .....
Brotula multibarbata Schlegel.

Family No. 101

CARAPIDAE

Pearlfish

1 (D-20) Pectoral fins long, going 2.25 times or less in head length; body whitish or pinkish translucent in color. ...
Carapus homei (Richardson)

Pectoral fins short, going more than 2.5 times in head length; body pale olive in color, not especially translucent. .....
Jordanicus gracilis (Bleeker)

Note: The Pacific Coast Canada by Clemens & Wilby the Stromateidae are labled Butterfishes. King & Ikeda in Food of Bigeye and Yellowfin (Fish Bull 108) label Nomeidae as Butterfishes.

Section No.

Family No. 102

STROMATEIDAE

1 (D-30) A single species reported, perhaps introduced. .....
[redacted] (Bonnaterre)
Monodactylus argenteus (Lacépède)

Family No. 103

NOMEIDAE

Butterfish

1 (B-29) Ventral fin not received in a fissure in abdomen, not attached to belly by membrane, see section 2

Ventral fins long and broadly attached to the belly by membrane, a slot or fissure present in abdomen into which ventral fins can be received. .....
Nomeus gronovii (Gmelin)

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2 Body short and deep, its greatest depth going less than 2 times in its length without caudal fin. .....
Psenes arafurensis Gunther.

Body elongate, its greatest depth going almost 4 times in its length without caudal fin. .....
Cubiceps evermanni (Jordan & Snyder)

Family No. 104

TETRAGONURIDAE

Square Tail

1 (B-27) A single species reported from Hawaiian waters. .....
Tetragonurus cuvieri Risso.

Section No.

Family No. 105

OPHICEPHALIDAE

Snakehead

1 (C-11) single species introduced into fresh waters of the Hawaiian Islands. L'A PAKE. PANCHON. SNAKEHEAD. .....
Ophicephalus striatus Bloch.

Family No. 106

SPHYRAENIDAE

Barracuda

1 (A-38) Tip of lower jaw capped with a fleshy appendage; maxillary not reaching anterior edge of eye by almost the width of the pupil; pectoral fins short, not reaching to a vertical through first dorsal fin insertion. KAWELEA. .....
Sphyraena helleri Jenkins.

Tip of lower jaw not capped by a soft fleshy appendage; maxillary reaches a vertical through anterior edge of eye; pectoral fins extend well beyond a vertical through dorsal fin insertion. KAKU. .....
Sphyraena barracuda (Walbaum)

Section No.

Family No. 107

MUGILIDAE

Mullet

1 (A-39) Upper lip much thinner than diameter of pupil of eye, see section 2

Upper lip thickened, greater than diameter of eye at thickest part. UOUCA. .....
Neomyxus chaptalii (Eydoux & Souleyet)

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2 (1) Insertion of spinous dorsal fin about midway between snout tip and caudal fin base or a little nearer to snout tip; about 40 scales, more or less, in lateral series. AMAAMA, MULLET. .....
Mugil cephalus Linne.

Insertion of spinous dorsal fin a little nearer caudal fin base than snout tip; less than 35 scales in lateral series. .....
Mugil trichilus Vaillant & Sauvage.

Family No. 108

ATHERINIDAE

Silver sides

1 (A-39) A single species of this family native to Hawaiian waters. IAO. .....
Pranesus insularum (Jordan & Evermann)

Family No. 109

POLYNEMIDAE

Threadfin

1 (A-34, B-6) A single native species. MOI. .....
Polydactylus sexfilis (Cuvier & Valenciennes)

Section No.

Family No. 110

SCORPAENIDAE

1 (B-41) Body not markedly compressed, its greatest width more than one third its greatest depth; a vertical through dorsal fin insertion not passing immediately behind eye. 2

Body compressed, its greatest width less than one third its greatest depth; a vertical through dorsal fin insertion passing immediately behind eye; a membrane between last dorsal fin ray and caudal peduncle; scales very thin, scarcely evident; tentacles on chin, lower jaw, snout, and over eye; pectoral rays all simple. .....
Taenianotus triacanthus Lacepede

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2 (1) Pectoral fin rays shorter than head. 5

Pectoral fin rays much longer than head. 3

---

3 (2) Upper pectoral rays simple. 4

Upper pectoral rays branched; body with 5 or 6 dark cross bars; dorsal fin spines elevated usually the membrane between not reaching beyond a third or a fourth of the distance to the tip; 12 spines and 10 rays in the dorsal fin, 6 in the anal; sometimes a tenacle over eye and on upper lip. .....
Dendrochirus brachypterus (Cuvier)

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4 (3) There are 13 spines and 11 rays in the dorsal fin; 7 to 9 broad brown cross bands with narrow bands on the white interspaces between; ventral fin with about 5 dusky crossbands. LION FISH. .....
Pterois sphex Jordan & Evermann

There are 12 spines and 11 rays in the dorsal fin; 7 blackish or brownish crossbands, white bordered anteriorly on body; a brownish longitudinal band on caudal peduncle; membrane of ventral fins blackish, the rays white. .....
Pterois radiata Cuvier

Section No.

5 The area between eyes on top of head scaled 15

The area between eyes on top of head not scaled 6

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6 (5) The third or fourth dorsal fin spines not abruptly longer than the rest 8

The third or fourth dorsal fin spines abruptly longer than the rest 7

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7 (6) The fourth dorsal spine longest; a dark blotch on dorsal fin membrane between second and third fin spines; body rather slender, depth 3.2 in length; body scales ctenoid; dorsal fin deeply notched .....
Iracundus signifer Jordan & Evermann

The third dorsal spine longest; body not slender, depth 2.2 in length; body scales cycloid; dorsal fin not deeply notched .....
Peloropsis xenops Gilbert

---

8 (6) Scales on body ctenoid; 32 or more scales in lateral series. 9

Less than 30 scales in lateral series; dorsal fin deeply notched or divided; tips of pectoral rays reach a vertical through anal fin rays, well beyond anal fin spines; scales on body cycloid .....
Setarches remiger (Gilbert & Cramer)

9 (8) Some, at least of the upper pectoral fin rays are divided or branched, sometimes only near the tips 10

None of the pectoral fin rays are divided or branched; head large, its length about one half that of standard length; eye diameter is much less than snout length; tip of longest pectoral fin rays reach well beyond a vertical through insertion of anal fin. Oopu kai Nohu. .....
Merinthe macrocephala (Sauvage)

10 (9) The eye is small, its diameter going 6 or more times in head length; no hooked spine below eye on preorbital; palatines without teeth; species often reach lengths in excess of ten inches 14

The eye is moderate in size, its diameter going 4.5 or fewer times in head length; a hooked spine below eye on preorbital; palatines with teeth; species small 11

Section No.

11 (10) Head and body not closely covered with fine sepia spots, see section 12

Entire upper and lateral surface of head and much of body closely set with sepia spots much smaller than pupil of eye .....
Sebastapistes coniorta Jenkin

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12 (11) Pectoral axil without white or light spots; a blackish blotch may be terminally between eighth and eleventh dorsal fin spines, see section 13

Pectoral axil with white or light spots; a blackish blotch terminally between third and fifth dorsal fin spines. .....
Sebastapistes nuchalis (Gunther)

13 (12) Snout goes 3.1 to 3.5 times in head length; 36 to 44 scales in lateral series on body and tail .....
Sebastapistes asperella (Bennett)

Snout goes 4 or a little more than 4 times in head length; about 45 scales in lateral series on body and tail. .....
Sebastapistes bynoensis (Richardson)

14 (10) Anterior nostril with a fleshy flap at posterior edge; dorsal spines short, third spine going 3.5 or more times in head length. Nohu .....
Scorpaenopsis gibbosa (Bloch & Schneider)

Anterior nostril without a flap; dorsal spines moderate in length, third spine going 3 or fewer times in head length. Nohu .....
Scorpaenopsis cacopsis - Jenkins

15 (5) 13 spines in first dorsal fin 18

12 or fewer spines in first dorsal fin 16

16 (15) Dorsal fin not divided or nearly divided to base between tenth and eleventh spines; greatest depth of body goes 3 or fewer times in length 17

Dorsal fin divided or nearly divided to base between tenth and eleventh spine; greatest depth of body goes 4 times in length; eye diameter much greater than length of snout; first two dorsal spines largely separated from those following .....
Plectrogenium nanum Gilbert

Section No.

17 (16) First dorsal spine one half or less length of second; eye large, its diameter greater than snout length .....
Helicolenus rufescens Gilbert

First dorsal spine about two thirds of length of second; eye diameter not markedly greater than snout length; a dark spot on membranes between eighth and tenth dorsal spines .....
Pontinus spilistius Gilbert

---

18 (15) Body with many minute dermal appendages .....
Scorpaenodes parvipinnis (Garrett)

Body without minute dermal appendages .....
Scorpaenodes kelloggi (Jenkins)

Family No. 111

CARACANTHIDAE

1 (C-22) Two dorsal fins present, anterior of spines, posterior of rays; body color reddish brown with red spots. .....
Caracanthus maculatus (Gray)

A single dorsal fin present, composed anteriorly of spines, posteriorly of rays, with a notch between the two portions; body color darker brown without spots. .....
Caracanthus unipinna (Gray)

Family No. 112

PLATYCEPHALIDAE

Alligator Fish

1 (B-28) A single deep water representative of this family native to Hawaii. .....
Bembradium roseum Gilbert.

Family No. 113

DACTYLOPTERIDAE

Flying Gurnard

1 (B-2, C-23) A single, wide ranging species in Hawaiian waters. .
Dactyloptena orientalis (Cuvier & Valenciennes)

Section No.

Family No. 114

PEGASIDAE

Sea Moths

1 (C-26) A single species native to Hawaiian waters. .....
Pegasis papilio Gilbert.

Family No. 115

BOTHIDAE

Flounders

1 (C-3) Lower jaw shorter than head (head length as measured from tip of upper jaw to hind edge of opercle), see section 2

Lower jaw longer than head, a gular pouch formed by the mandibular membranes present. .....
Pelicanichthys crumenalis Gilbert & Cramer.

---

2 (1) Maxillary less than 1/2 head length, see section 3

Maxillary more than 1/2 head length, going about 1.6 times into head length. .....
Chascomopsetta prorigera Gilbert.

---

3 (2) Scales small, about 80 or more in lateral line, see section 5

Scales moderate in size, 36 to 50 in the lateral line, see section 4

---

4 (3) Anal with 56 to 58 rays; scales in lateral line 46 or less in number, see section 5

Anal with 66 rays; scales in lateral line about 50 in number. .....
Engyprosopon xenandrus Gilbert.

Section No.

5 (4) 46 scales in longitudinal series. .....
Engyprosopon hawaiiensis Jordan & Evermann.

36 scales in longitudinal series. .....
Engyprosopon arenicola Jordan & Evermann.

---

6 (4) Dorsal fin insertion just ahead to well ahead of anterior margin of upper eye, see section 7

Dorsal fin insertion on a vertical through middle of upper eye; depth of body over or about 1/2 its length without the caudal fin. .....
Poecilopsetta hawaiiensis Gilbert.

---

7 (6) Dorsal fin insertion well in advance of anterior margin of upper eye; pectoral fin (on eyed side) with more than 4 rays, see section 8

Dorsal fin insertion about on a vertical through anterior margin of upper eye; pectoral fin with only 4 rays. .....
Samariscus corallinus Gilbert.

---

8 (7) Greatest depth of body goes less than 2.5 times in length to caudal fin base; scales covering upper side ctenoid, or if not ctenoid but cyloid, interorbital space much wider than pupil of eye; interorbital space from 1/2 diameter of pupil of eye to more than diameter of eye, see section 9

Greatest depth of body about 2.7 in length to caudal fin base; scales covering upper side cycloid; interorbital space 1/3 diameter of pupil of eye. .....
Arnoglossus debilis (Gilbert)

---

9 (8) Anal fin rays 89 or more in number; dorsal fin rays more than 105 in number, see section 12

Anal fin rays 80 or less in number; dorsal fin rays 100 or less in number, see section 10

Section No.

10 (9) Anal fin rays 70 or less in number, see section 11

Anal fin rays about 78 in number; dorsal about 98. PAKII. .....
Bothus mancus (Broussonet)

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11 (10) Greatest depth of body about 1/2 of its length to caudal fin base; anal fin with about 69 rays. .....
Bothus pantherinus (Ruppell)

Greatest depth of body about 3/5 of its length to caudal fin base; anal fin with about 62 rays. .....
Bothus bleekeri Steindachner.

---

12 (9) Interorbital width approximately equal to length of snout from foreborder of lower eye; dorsal fin with about 108 rays; anal fin with about 89. .....
Parabothus chlorospilus (Gilbert)

Interorbital width far less than length of snout measured from foreborder of lower eye; dorsal fin with about 114 to 121 rays; anal fin with about 93 to 98 rays. .....
Parabothus coarctatus (Gilbert)

Family No. 116

PARALICHTHYIDAE

Bastard Halibuts

1 (C-3) A single Hawaiian species. .....
Taeniopsetta radula Gilbert.

Family No. 117

ECHENEIDIDAE

Shark Suckers REMORA

1 (B-33) Sucking disk on top of head long, going less than 3 times in body length to base of caudal fin, with 15 or more plates or laminae across it; dorsal and anal fin rays 25 or less in number, see section 2

Section No.

1 (B-33) Sucking disk on top of head short, going over 4 times in body length to caudal fin base, with 10 plates or laminae across it; dorsal and anal fin rays about 33 in number. .....
Phtheirichthys lineatus (Menzies)

---

2 (1) Sucking disk length goes about 2.75 times in body length without caudal fin, head goes less than 4 times, 22 to 24 rays in dorsal fin; 25 rays in anal fin. .....
Echeneis remora Linne.

Sucking disk length goes about 2.25 times in body without caudal fin, head goes about 5 times; 5 spines and 16 rays in dorsal fin; 4 spines and 20 rays in anal fin. .....
Remoropsis brachyptera (Lowe)

Family No. 118

BALISTIDAE

Trigger Fish

1 (D-15) A naked groove before eye below nostrils, see section 3

No naked groove before eye; scales on caudal peduncle, in part with spines, see section 2

---

2 (1) A broad black band on side extending downward and backward, from eye and lower base of pectoral fin, to vent and fourth from last anal ray; a wedge shaped black band covering entire caudal peduncle, pointed anteriorly, and bounded by narrow greenish lines. .....
Balistapus rectangulus (Bloch & Schneider)

Side with dusky patch extending in 4 or 5 oblique fingers posterio-ventrally; spinous scales on caudal peduncle on a pale patch of color; a patch of blue between eyes, extending downward below eyes as several narrow blue bands. .....
Balistapus aculeatus (Linnaeus)

Section No.

3 (1) Some enlarged scales or bony plates present behind gill opening, see section 6

No enlarged scales or bony plates present behind gill opening, see section 4

---

4 (3) Lower jaw not markedly projecting; sides of cheek without 4 or 5 naked grooves running horizontally between rows of enlarged scales, see section 5

Lower jaw projecting; sides of cheek with 4 or 5 naked grooves running horizontally between rows of enlarged scales. .....
Xanthichthys ringens (Linnaeus)

---

5 (4) First dorsal spine short, going more than 2 times in length of head; body marked everywhere with pale spots, largest on ventral surface, and those nearly equal to diameter of eye. .....
Canthidermis maculatus (Bloch)

First dorsal spine long, going less than 2 times in length of head; coloration uniform buff in preservative, may be spotted in life. .....
Canthidermis rotundatus (Proce)

---

6 (3) Outer rays of caudal fin not prolonged, not significantly longer than middle rays, see section 8

Outer rays of the caudal fin prolonged, longer than the middle rays, see section 7

---

7 (6) General color dark bluish or blackish; narrow light blue (in life) or white (in preservative) line horizontally on base of both second dorsal and anal fins; a series of narrow blue bands (in life) radiating from eye as center over top of head. HUMU-HUMU ELE-ELE. .....
Melichthys buniva (lacepede)

Section No.

7 (6) Color not as described above; usually with a black blotch on back including spinous dorsal fin; about 14 or 15 longitudinal dark brown lines on body. .... Balistes fuscus Schneider.

---

8 (6) Base of second dorsal fin greater than head length measured from upper corner of gill opening to snout tip by an amount more than 1/2 eye diameter, see section..... 10

Base of second dorsal fin about equal to or less than head length when measured as described above, see section .....

---

9 (8) Scales on side of body from behind gill opening and pectoral fin each with a spinous tubercle, those largest and sharpest posteriorly, and arranged in more than 20 rows. ..... Balistes bursa Lacepede.

Scales with a spinous tubercle confined to a patch of 7 or 8 rows beginning posteriorly to the middle rays of the soft dorsal fin and running back to the caudal peduncle. ..... Balistes capistratus Shaw.

---

10 (8) Soft dorsal and anal fins elevated anteriorly; distance between insertions of first and second dorsal fins less than length of anal fin base. ..... Balistes vidua Solander.

Soft dorsal and anal fins not elevated anteriorly; distance between insertion of first and second dorsal fins greater than length of anal fin base. ... Balistes nycteris (Jordan & Evermann)

Family No. 119

MONACANTHIDAE

File Fish

1 (D-15) Pubic base projecting, spiny at tip; length of base of anal fin less than that of dorsal fin; anal fin with less than 40 rays, see section 3

Section No.

1 (D-15) Pubic bone without projecting spiny end; length of base of anal fin more than that of dorsal fin; anal fin with more than 45 rays, see section 2

---

2 (1) Longest caudal fin rays greater in length than distance between insertion of first and second dorsal fins. .....
Alutera scripta (Osbeck)

Longest caudal fin rays less in length than distance between insertion of first and second dorsal fins. .....
Alutera monoceros (Linnaeus)

---

3 (1) Spiny tip of projecting pubic bone not jointed near tip and not movable, see section 4

Spiny tip of projecting pubic bone jointed near tip and movable; caudal fin reddish; generally body color yellowish with numerous scattered spots in life. .....
Monacanthus spilosoma Lay & Bennett.

---

4 (3) Mouth terminal in position, lower jaw not noticeably projecting beyond upper, see section 5

Lower jaw projecting beyond upper, placing mouth on upper profile. .....
Paramonacanthus garretti Fowler.

---

5 (4) Anal fin with 31 or more rays; diameter of eye less than interorbital width, see section 6

Anal fin with 29 rays; diameter of eye approximately equal to interorbital width. .....
Cantherines pardalis (Ruppell)

---

6 (5) Second dorsal fin with an initial spine and 36 rays; anal fin with 31 rays; body not marked with numerous white spots in life. .....
Cantherines sandwichiensis (Quoy & Gaimard)

Section No.

6 (5) Second dorsal fin with two initial spines and 38 rays; anal fin with 33 rays; body may be marked with numerous white spots in life. .....
Catherines howensis (Ogilby)

Family No. 120

OSTRACIIDAE

Trunk Fish

1 (D-16) Carapace with 4 longitudinal ridges closed behind dorsal and anal fins, see section 2

Carapace with 6 longitudinal ridges open behind dorsal and anal fins. .....
Aracana aculeata (Houttuyn)

---

2 (1) Carapace with a spine over eye and one sometimes in back, see section 5

Carapace without spines over eye, see section 3

---

3 (2) Ventral surface of carapace without small whitish or bluish spots, see section 4

Ventral surface of carapace with small whitish or bluish spots, these also present over rest of body and tending to run together into reticulations on ventral surface. OOPU PAHU. .....
Female *Ostracion lentiginosum* Bloch & Schneider.

---

4 (3) Dorsal surface of carapace with light spots; sometimes a broad golden band vertically through eye in life. .....
Male *Ostracion lentiginosum* Bloch & Schneider.

Dorsal surface of carapace without spots or sometimes with small scattered dark spots, these more especially on head, ventral surface, caudal peduncle and fin bases. .....
Ostracion cubicus Linne.

Section No.

5 (2) A spine present on back before dorsal fin, see section 6

Spine not present on back before dorsal fin. .....
Lactoria cornutus (Linne)

---

6 (5) Spines present on dorso-lateral ridge posterior of eye; ventral part of carapace translucent. .....
Lactoria diaphanus (Schneider)

Spines not present on dorso-lateral ridge posterior of eye; ventral part of carapace not translucent. .
Lactoria fornasini (Bianconi)

Family No. 121

TETRODONTIDAE

Puffers

1 (D-19) Caudal peduncle without a lateral keel or welt, see section 3

Caudal peduncle with a keel or raised welt on ventro-lateral surface, see section 2

---

2 (1) Inflatable abdomen covered with many close set prickles, remainder of body surface smooth. .....
Sphoeroides lagocephalus (Linne)

Spines on body not confined to abdomen, scattered and wide set except from axilla backwards and on caudal peduncle. .....
Sphoeroides hypselogenion (Bleeker)

---

3 (1) Interorbital width goes 2.5 times or less in head length; greatest body depth when not inflated goes less than 3 times in its standard length, see section 4

Interorbital width goes over 3 times in head length; greatest body depth when relaxed goes about 3 times in its standard length. .....
Liosaccus cutaneus (Gunther)

Section No.

4 (3) Body not thickly covered everywhere with small whitish spots, at least not on ventral surface which may have light longitudinal bands if rest of body is spotted with white, see section 5

Body thickly covered everywhere with small whitish spots, these largest on ventral surface, but mostly smaller than pupil of eye in diameter, no light longitudinal bands on abdomen. .....
Tetrodon meleagris Schneider.

---

5 (4) Small scattered wide-set black spots usually present on body, these thickest on belly. .....
Tetrodon nigropunctatus Schneider.

No scattered black spots present on body; head and dorsal surface of body usually with small scattered grayish to whitish spots; usually six or more light longitudinal bands along abdomen. СОРИНЕ, BALLOON FISH. .....
Tetraodon hispidus Linne.

Family No. 122

CANTHIGASTERIDAE

Sharp backed Puffer

1 (D-19) Although blue lines may radiate from eye or not, there are not exactly 3 or 4 brown edged blue lines across interorbital, see section 2

There are 3 or 4 brown edged, blue lines from eye across interorbital. .....
Canthigaster margaritatus (Ruppell)

---

2 The least depth of the caudal peduncle goes 2.6 times or frequently less in head length, see section 3

The least depth of the caudal peduncle goes about 3 times, more or less, in head length. .....
Canthigaster striolatus (Quoy & Gaimard)

Section No.

3 Longest pectoral fin rays goes 2.5 or more times in length of head which in turn goes less than 2.8 (usually 2.6) times in standard length, see section 4

Longest pectoral fin rays goes about 2 times, more or less, in length of head, which in turn goes about 2.8 times in standard length. .....
Canthigaster amboinensis (Bleeker)

---

4 Body without 3 or 4 dark saddles across back, see section 5

Body with 3 or 4 dark saddles across back; upper profile of snout concave. .....
Canthigaster cinctus (Richardson)

---

5 Length of caudal fin goes about 1.3 times in head length; color pattern not principally one of scattered light spots, mostly larger than pupil of eye. .....
Canthigaster rivulatus (Schlegel)

Length of caudal fin goes about 1.6 times in head length; color pattern one principally of scattered light spots, mostly larger than pupil of eye. .....
Canthigaster jactator (Jenkins)

Family No. 123

DIODONTIDAE

Spiny Puffer

1 (D-18) Spines on body erectile, mostly two rooted..... 2

Spines on body not freely erectile, mostly three rooted .....
Chilomycteris affinis Gunther

2 Frontal spines about one-half length of post pectoral spines. .....
Diodon hystrix Linne.

Frontal spines longer than post pectoral spines, about twice eye diameter in adult. .....
Diodon holacanthus Linne.

Section Ab.

Family No. 124

MOLIDAE

Headfish SUNFISH TTO)

1 (D-18) Greatest depth of body substantially more than one-half its standard length, greatest pectoral fin width equal or a little less than its length, see section 2

Greatest depth of body approximately one-half its standard length; greatest pectoral fin width less than one-half its length; caudal fin without pointed tip. MAKUA. .....
Ranzania truncata (Gmelin)

---

2 (1) Caudal fin with middle rays longer than rest, forming a pointed tip; eye completely above a line from corner of mouth to upper angle of gill opening. .....
Masturus lanceolatus (Lienard)

Middle caudal fin rays not extended into a projecting tip; a line from corner of mouth to upper angle of gill opening passing through eye. SUNFISH. .....
Mola mola (Linne)

Family No. 125

LOPHIIDAE

Frogfish

1 (B-20) A single species native in Hawaii. Deep sea. .....
Lophiomus miacanthus Gilbert.

Section No.

Family No. 126

ANTENNARIIDAE

Angler Fish

1 (B-20, C-29) Caudal peduncle short; distance from last dorsal fin ray to caudal fin base less than one-half depth of the caudal peduncle, see section 5

Caudal peduncle long; distance from last dorsal fin ray to caudal fin base more than one-half depth of the caudal peduncle, see section 2

---

2 (1) Color very dark, blackish brown in alcohol marbled with darker; a large blackish brown spot on basal portion of posterior dorsal and anal rays; a whitish spot above base of pectoral. .....
Antennarius commersonii (Lacepede)

Color not very dark, ranging from yellowish white to grayish brown, see section 3

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3 (2) Diameter of eye goes about 2.5 times in the snout length, see section 4

Diameter of eye goes about 3.5 times in the snout length. .....
Antennarius sandvicensis (Bennett)

---

4 (3) Anal fin has 7 rays. .....
Antennarius hispidus (Schneider)

Anal fin has 6 rays. .....
Antennarius leprosus (Eydoux & Souleyet)

---

5 (1) Gill opening immediately behind pectoral fin, see section 6

Gill opening located about half way from pectoral fin axil to anus, small and circular. .....
Antennarius duescus Snyder.

Section No.

6 (5) Bait as long or longer than first dorsal spine, see section .....

Bait shorter than first spine. .....
Antennarius nexilis Snyder.

---

7 (6) Bait terminated by a filament. .....
Antennarius bigibbus (Lacepede)

Bait terminated by a fleshy knob; fins with yellowish tips in life. .....
Antennarius nummifer Cuvier & Valenciennes.

Family No. 127

SYNBRANCHIDAE

Rice field eel

1 (D-10) A single introduced species in Hawaiian fresh water. .....
Fluta alba (Zuiew)

GLOSSARY

ABDOMINAL: Pertaining to the belly; said of the ventral fins of fishes when inserted considerably behind the pectoral fin, the pelvic girdle to which the ventral fins are attached having no connection with the pectoral, or shoulder, girdle.

ABDOMINAL FINS: Ventral fins when placed well behind the pectoral fins and the pelvic arch, to which they are attached but not connected with the shoulder girdle.

ACCESSORY BRANCHIAL ORGAN: A vascular cavity or labyrinth located above the gill cavity in the basal part of the head.

ACTINOSTS: A series of bones at the bases of pectoral rays. Also called brachial ossicles.

ADIPOSE EYELID: Broad fatty eyelid covering most of the eye in such fishes as Elops, many gray mullets, mackerels, crevalles, and thread fishes.

ADIPOSE FIN: A fleshy projection on the posterior part of the back, never with any fin rays, rarely with an initial spine in some fresh water species (Corydoras).

AIR BLADDER: A sac filled with air placed below the backbone, corresponding to the lungs of higher animals. Also called air vessel, and swim bladder.

ANAL: Refers to the vent or anus.

ANAL FIN: The fin on the median line, behind the vent, in fishes.

ANAL PAPILLA: A fleshy projection at the vent, some bilobed, in some blennies branched or dendrite.

ANTRORSE: Turned forward, usually with reference to barbs on spines of fins.

ARTICULATE: Jointed, refers to rays in distinction to spines which are entire.

AXILLARY SCALES: Scales, usually enlarged situated in the axilla, or the inner basal area of the pectoral fin.

AXILLARY SHEATHS: A sheath formed of scales located at the inner basal part of the pectoral fin.

AXIS: Of the body; a line from the tip of the snout to the center of the end of the tail (longitudinal axis) about which the body would be in perfect balance. Other axes are the vertical and the lateral which are at right angles vertically and laterally respectively to the longitudinal axis.

BARBELS: Elongated fleshy projections, usually about the head and especially the mouth.

BRACKISH WATER: Salty water that is less salty than the sea, such as would occur in the mouths of rivers or other places where fresh water enters the sea.

BATHYPELAGIC: Distinguishes fishes usually widely distributed in the great depths of the ocean.

BICUSPID: Two-pointed, usually refers to teeth.

BODY: The whole fish - head, trunk, and tail.

BRANCHIOSTEGALS: Body rays supporting membranes under the head below the opercular bones. Mostly used in determining generic or family characters.

BUCCAL: Relating to the mouth.

CAECUM: Blind sack-like appendage connected with the alimentary canal at the posterior end of the stomach.

CANINES: Any conical teeth in jaws larger or longer than the others.

CARDIFORM: Refers to slender teeth set closely like those of a card. (A fine multipule comb).

CARINATE: Keeled, usually with reference to a ridge along median line.

CAUDAL FILAMENT: A slender, threadlike structure rising from the tail or caudal fin.

CAUDAL FIN: The fin on the tail.

CAUDAL PEDUNCLE: The region between the anal and caudal fins.

CENTRUM: Body of a vertebra.

CEPHALIC LOBES: Appendages on the head of certain rays.

CHIASMA: Crossing of the optic nerve fibers.

CHIN: Space at front of lower jaw.

CIRRI: Fringes, usually smaller structures than barbels.

CLASPERS: Male reproductive organs attached to the ventral fins of sharks, skates, rays, and chimaeras.

COMPRESSED: Flattened from one side to the other, as in most fishes.

CONIC: Of teeth; cone shaped, rounded in cross-section and with a single, centered point at the top.

CONNATE: A part of, firmly united with.

CRANIUM: The brain case.

CTENOID: Usually refers to scales with rough edges, due to being minutely spinous or pectinated.

CYCLOID: Usually refers to scales with smooth edges, not ctenoid, but concentrically striate.

DECIDUOUS: Of scales, easily dislodged, falling off.

DENTATE: With teeth-like notches.

DENTICULATE: Toothed, with many regularly arranged points.

DEPRESSED: Flattened vertically, as in all skates, rays, and flatheads.

DEPTH: Usually refers to vertical diameter of body.

DISC: Round and flattened like a wheel; said of the wings and body of some of the rays.

DISTINCT: Independent of, separated from.

DIVERGENT: To recede from a common center in opposite directions.

DORSAL: Relating to the back.

DORSAL FIN: The fin on the back.

ENTIRE: Smooth, not notched or serrate, without spines or projections.

EXSERTED: Projecting beyond the general level.

FALCATE: Sickle-shaped, often with reference to the pectoral fin. Falciform.

FILIFORM: Thread-form. Filamentous.

FIN BASE: The place of attachment of the fin to the body.

FIN RAYS: The cartilaginous rods which support the fin membranes of fish, when these are jointed or branched.

FIN SPINES: The bony or cartilaginous rods that support the fin membranes which are unjointed and not branched, and usually, but not always, more or less stiff and sharp pointed.

FONTANEL: An unossified space, as the top of head covered by membranes.

FOREHEAD: Frontal curve of head. Often called frontal region.

FOSSAE: Usually grooves in which nostrils open.

FREE FIN RAYS: Fin rays in which the membrane that usually connects one with the other is very deeply incised or absent.

FRINGED: Of lips, formed of regularly arranged flexible, fleshy points.

FURCATE: Forked.

FUSIFORM: Spindle-shaped, or tapering at both ends.

GAPE: Opening of the mouth. Mouth cleft.

GILLS: Organs, situated usually in the throat, for breathing the oxygen contained in the water.

GILL: Opening; slits; as used here the external opening of the gill cavity or where they are several, they are called collectively slits.

GILL MEMBRANES: The skin or membranes about the gill openings, especially ventrally in the region of the throat.

GULAR: Relating to the upper foreneck.

GULAR PLATE: A flat membrane bone situated between the branches of the lower jaw.

HAEMAL SPINE: Lowermost spine of a caudal vertebra.

HETEROCERCAL: Unequally lobed tail with backbone evidently extending into the upper lobe.

HOMOCERCAL: Equally lobed tail with backbone stopping at middle of base of caudal.

HYOID: Relating to the tongue.

HYPOCORACOID: Bones of the shoulder girdle, the lowermost of those to which the actinosts, a series of small bones at the base of the pectoral fins, are attached.

HYPURAL: Modified last vertebra, some expanded, supporting caudal fin.

IMBRICATED: Overlapping, like shingles on a roof.

INFERIOR: Low, on the ventral surface, on the underside.

INSERTION: Of fins, the place of attachment.

HOMOCERCAL: Refers to a tail of which the last vertebrae are graduated smaller and end in median line of caudal fin as in gadoids.

ISTHMUS: The throat, the area between the gill clefts ventrally.

JUGULAR: Pertaining to the lower throat, said of the ventral fins when placed forward of a vertical through the place of attachment of the pectoral fins.

KEEL: (LATERAL LINE) A ridge, usually on the caudal peduncle or the base of the tail.

LARVA: An immature form which must undergo change of appearance before becoming adult, as in many eels.

LATERAL LINE: A series of muciferous tubes or pores, usually through the scales, forming a longitudinal line along the side of the body. The function of the lateral line is apparently sensory.

LUMINOUS GLANDS: (See photophores) appearing as shining spots arranged, as a rule, in regular fashion on the body.

LUNATE: Form of new moon or crescent-shaped. Usually refers to a broad and shallow forked caudal lobe as in porbeagles and mackerels.

MANDIBLE: Lower jaw.

MAXILLARY: Outermost or hindermost bone of the upper jaw, joining with the pre-maxillary in front, and usually extending back farther than the latter.

MOLARS: Grinding teeth, usually posterior in the jaws as in the porgies.

NAPE: Neck above, next to the occiput.

NARES: Nostrils. Usually 2, rarely 1, each side of snout.

NEURAL SPINE: Uppermost spine of a vertebra.

NICTITATING MEMBRANE: The third or inner eyelid which moves across the eyeball, found in some birds and sharks.

OBSOLETE: Scarcely evident, disappearing.

OCCIPITAL: Relating to the occiput or back of the head above.

OCELLATE: Refers to color pattern, eye-like, usually roundish with a lighter or darker border.

OPERCLES: Gill covers; the posterior membrane bones on each side of the head.

ORBIT: Bony eye socket.

ORBITAL REGION: Region of the eye.

OVIPAROUS: Producing eggs developed after exclusion from the body, as in most fishes.

PALATE: Roof of the mouth.

PALATINES: Pair of membrane bones on mouth roof, one each side extending out band from vomer, sometimes with teeth.

PAPILLA: A small fleshy projection.

PARIETAL: Bone on each side of head above.

PAVEMENT LIKE: Of teeth, set out in the mouth like tile.

PECTORAL: Relating to the breast.

PECTORAL FIN: The anterior or uppermost of the paired fins.

PECTORAL GIRDLE: The bony girdle to which the pectoral fins are attached.

PELAGIC: Living in or on high seas.

PELVIC GIRDLE: Bones supporting ventral fins.

PELVIS: Bones to which hind limbs or ventral fins are attached.

PERITONEUM: Membrane lining abdominal cavity.

PHARYNGEAL BONES: Bones behind gills at beginning of oesophagus, of various forms, generally with teeth. In most fishes placed as a single pair below and a double pair above.

PHOSPHORESCENT SPOTS: (See photophores). Areas that omit light in the living fish, and that usually appear as shining lensed spots, regularly arranged, in a preserved specimen.

PHOTOPHORES: Luminous glands, appearing as round lensed spots usually arranged in a more or less regular pattern on the body. See also: Luminous Glands Phosphorescent Spots.

PILCATE: Folded, so as to show transverse folds or wrinkles.

PLUMBEOUS: Lead-colored, dull bluish-gray.

POSTERIOR: After, behind, towards the tail.

POSTOCULAR: Behind eye. Postorbital.

PREMAXILLARIES: The bones, one on each side, forming the front of the upper jaw. They are usually larger than the maxillaries and commonly bear most of the upper teeth. In many fishes they extend along the side excluding the maxillaries from the margin of the jaw.

PREMOLARS: Small grinders, or teeth, between canines and true molars.

PREOCULAR: Before eye.

PREORBITAL: A large membrane bone before the eye.

PROTRACTILE: Capable of being drawn forward.

PROXIMAL: Nearest, usually basal.

PSEUDOBRANCHIAE: Small gills developed on the inner side of the opercle, near its junction with the preopercle.

PUBIC BONES: Pelvic bones. (See also pelvis and pelvic girdle).

PYLORIC CAECA: Glandular appendages formed as blind sacs, opening into alimentary canal at pylorus or junction of stomach with intestine.

RECURVED: Curved upward.

RETICULATE: Marked like a network.

RETRORSE: Turned backward.

RUDIMENTARY: Undeveloped, degenerate.

RUGOSE: Rough with wrinkles.

SCUTES: Overlapping bony plates linearly arranged along the posterior part of the lateral line, extending to the base of the caudal fin.

SECOND DORSAL: Posterior or soft part of a dorsal fin when the two parts are separated.

SEPTUM: A thin partition.

SERRATE: Notched like a saw.

SETACEOUS: Bristly.

SETIFORM: Bristle-like.

SHOULDER-GIRDLE: Bony girdle back of head forming attachment for front or pectoral fins and sometimes articulated with the ventral or pelvic fins.

SOFT DORSAL: Posterior part of dorsal fin when composed of soft rays.

SOFT RAYS: Articulating rays of fin, usually branched.

SPATULATE: Spoon-shaped.

SPINOUS DORSAL: Front part of dorsal fin when composed of spinous rays.

SPIRACLES: Openings in head and neck, as in sharks and skates, usually behind eye.

STRAINERS: Of gills; appendages, variously formed, along the inner edge of the gill arch.

STRIATE: Striped or streaked.

SUBCAUDAL: Lower lobe of tail as in many sharks.

SUBORBITAL STAY: Bone extending from one of suborbitals across the cheek towards preopercle, as in sculpins, gurnards and flat-heads.

SUBJUGULAR: In the region between the throat and belly; below or behind the jugular (throat).

SUBULATE: Of teeth; awl-shaped, rounded, smooth, and very sharply pointed.

SUPPLEMENTARY MAXILLARY: Small bone along upper edge of maxillary.

SUPRASCAPULAR: Post-temporal, or bone joining shoulder-girdle with skull.

SUTURE: Line of union of two bones.

SYMPHYSIS: The point of junction of the two parts of the lower jaw, the tip of the chin.

TAIL: That part of the body posterior to the anal fin (often used more or less vaguely).

TENTACLE: Fleshy, a flexible, elongate rod of tissue, usually tapering to a fine point, but sometimes with lobed ends or many fine brushlike points.

TERMINAL: Of the mouth, when positioned forward of any other structure on the head, not overhung by the snout.

THORAX: Pertaining to the chest - the region below or behind the head and forward of the belly. Ventral fins are thoracic when attached immediately below the pectoral fins and connected with them through the pelvic girdle being attached by bones with the pectoral girdle.

THORACIC FINS: So called when attached immediately below the pectorals, as in groupers and snappers, the pelvic bones being fastened to the shoulder girdle.

TRIANGULAR: Of teeth; shaped like a triangle, flattened, the two sides (edges) and the base forming a triangle.

TRICUSPID: Of teeth; with three cusps, three projecting lobes on the cutting edge.

TRUNCATE: Abrupt, cut square.

VENT: Anus.

VENTRAL: Relating to the abdomen.

VENTRAL FINS: The paired fins behind or below the pectoral fins, sometimes fused into one; also called pelvic fins.

VENTRAL PLATES: Row of plates along belly between throat and vent.

VERTEBRAL SPINES: Sharp bony projections rising upward from and an integral part of, the vertebra.

VERTICAL FINS: Fins of the median line of the body as the dorsal, anal and caudal.

VOMER: Bone immediately behind maxillaries in front part of roof of mouth.

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Kala	Naso unicornis	88	18
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Kawakawa	Euthynnus yaito	92	4
Kawelea	Sphyraena helleri	106	1
Kihikihi	Zanclus cornutus	87	1
Kikakapu	Chaetodon ornatissimus	86	11
Kumu	Pseudupeneus porphyreus	70	16
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Lai	Scomberoides tolooparah	76	22
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Lancelets	Amphioxides pelagicus	1	1
Lancet Fish	Alepisaurus aesculapius	26	1
Lauia	Scarus formosus	83	7
Lauipala	Zebrasoma flavescens	88	4
Lauwiliwili Nukunuku Oeoe	Forcipiger longirostris	86	2
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	Acanthurus elongatus	88	16
Makiawa	Etrumeus micropus	17	1
Makua	Ranzania truncata	124	1
Mololo	Cypselurus simus	42	11
Malu	Pseudupeneus pleurostigma	70	10
Manila Fish	Cheilodactylus vittatus	74	1
Manini	Acanthurus sandvicensis	88	5
Mano kihikihi	Sphyrna zygaena	8	1
Maomao	Abudefduf abdominalis	81	13
Marlin, Black	Makaira mazara	93	3
Marlin, Striped	Makaira grammatica	93	3
Milkfish	Chanos chanos	19	1
Moano	Pseudupeneus multifasciatus	70	13
Moi	Polydactylus sexfilis	109	1
Mollie	Mollienesia latipinna	44	2
Moonfish	Lampris regius	50	1
Moonfish	Platypoecilus maculatus	44	3
Mosquito fish	Gambusia affinis	44	5
Mu	Monotaxis grandoculis	64	1
Mullet	Mugil cephalus	107	2
Munu	Pseudupeneus bifasciatus	70	13
Naenae	Acanthurus olivaceus	88	11
Nenue	Kyphosus bigibbus	65	2
Needlefish	Belone platyura	41	3
Nehu	Anchoviella purpurea	18	1
Niuhi	Carcharodon carcharias	2	1
Nohu	Scorpaenopsis cacopsis	110	14
	Scorpaenopsis gibbosa	110	14
Nunu	Aulostomus chinensis	45	1
Nunu Peke	Fistularia petimba	46	1
Oarfish	Lophotes capellei	51	1
Ohua	Cantherines sandwichiensis	119	6
Oili	Monacanthus spilosoma	119	3
Oili-lepa	Cantherines sandwichiensis	119	6
Oio	Albula vulpes	16	1
Omaka	Alepes mate	76	16
Omilu	Caranx stellatus	76	13
Onaga	Etelis carbunculus	62	9
Ono	Acanthocybium solandri	92	1
Opah	Lampris regius	50	1
Opakapaka	Pristipomoides microlepis	62	8
Opelu	Decapterus pinnulatus	76	20
Opule	Anampses cuvier	82	21
Oopu	Awaous guamensis	96	12
Oopu kui	Clarias fuscus	31	1
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	Bothus pantherinus	115	11
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Panchon	Ophicephalus striatus	105	1
Paopao	Gnathanodon speciosus	76	12
Pualu	Acanthurus bariene	88	7
Pauu	Caranx ignobilis	76	10
Piha	Spratelloides delicatulus	17	1
Pilikoa	Paracirrhites arcatus	75	4
Pilot fish	Naucrates ductor	77	2
Pipefish, Bail's	Syngnathus balli	49	3
Platy	Platypoecilus maculatus	44	4
Poopaa	Cirrhitus pinnulatus	75	2
Puffer, Porcupine	Diodon hystrix	123	2
Puffer, Sharp backed	Canthigaster jactator	122	5
Puhi	Echidnidae (Muraenidae)	40	
Rainbow Runner	Elagates bipinnulatus	77	1
Ratfish	Chimaera gilberti	14	1
Ray, Eagle	Aetobatus narinari	12	1
Ray, Manta	Manta birostris	13	1
Ray, Sting	Dasyatidae	11	1
Remora	Echeneis remora	117	2
Sailfin	Mollienesia latipinna	44	2
Sailfish	Istiophorus orientalis	93	2
Salmon, Hawaiian	Elagates bipinnulatus	77	1
Sardine, Hawaiian	Etrumeus micropus	17	1
Sea horse, Common	Hippocampus kuda	49	2
Sea horse, Spiny	Hippocampus histrix	49	2
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Shark, Black tipped	Carcharhinus melanoptera	6	6
Shark, Bonito	Isurus glaucus	2	1
Shark, Cat	Pentauchus spongiceps	5	1
Shark, Great blue	Prionace glauca	6	2
Shark, Great white	Carcharodon carcharias	2	1
Shark, Hammerhead	Sphyrnidae	8	
Shark, Thresher	Alopias vulpinus	3	1
Shark, Tiger	Galeocerdo cuvier	6	9
Shark, Soupfin	Galeorhinus galeus	6	9
Shark, Whale	Rhincodon typus	4	1
Shark Sucker	Echeneis remora	117	2
Shrimpfish	Centriscus strigatus	48	1
Snakehead	Ophicephalus striatus	105	1
Snipefish	Macrorhamphosus velitaris	47	1
Spearfish, Shortnosed	Tetrapturus brevirostris	93	1
Swordfish, Broadbill	Xiphias gladius	94	1
Swordtail	Xiphophorus helleri	44	2
Sunfish, Bluegill	Lepomis macrochirus	58	1
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Tang, Sailfin	Zebrasoma veliferum	88	4
Tenpounder	Elops machnate	15	1
Threadfin	Polydactylus sexfilis	109	1
Tohay	Conger cinereus	35	6
Tope	Galeorhinus galeus	6	9
Triggerfish, Spotted	Canthidermis maculatus	118	5
Trout, Rainbow	Salmo gairdnerii	21	1
Trumpet fish	Aulostomus chinensis	45	1
Trunkfish	Ostracion cubicus	120	4
	Ostracion lentiginosum	120	3, 4
Tuna, Big Eye	Parathunnus sibi	92	10
Tuna, Black	Thunnus orientalis	92	7
Tuna, Bluefin	Thunnus thynnus	92	6
Tuna, Japanese Bluefin	Thunnus orientalis	92	7
Tuna, Yellowfin	Neothunnus macropterus	92	10
Uhu	Scarus ahula	83	13
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Uiui	Bothus pantherinus	115	11
Uku	Aprion virescens	62	5
Ulae	Saurida gracilis	24	2
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Ulua kihikihi	Alectis ciliaris	76	5
Ulua, Black	Caranx sexfasciatus	76	15
Ulua, White	Carangoides ajax	76	9
Upapalu	Apogon frenatus	56	6
Uouoa	Neomyxus chaptalii	107	1
Uu	Myripristis murdjan	54	5
Uwiuwi	Monacanthus spilosoma	119	3
Wahoo	Acanthocybium solandri	92	1
Walu	Ruvettus pretiosus	89	2
Weke	Mulloidichthys samoensis	70	4
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